VOLUME XXVI NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JULY, 1914

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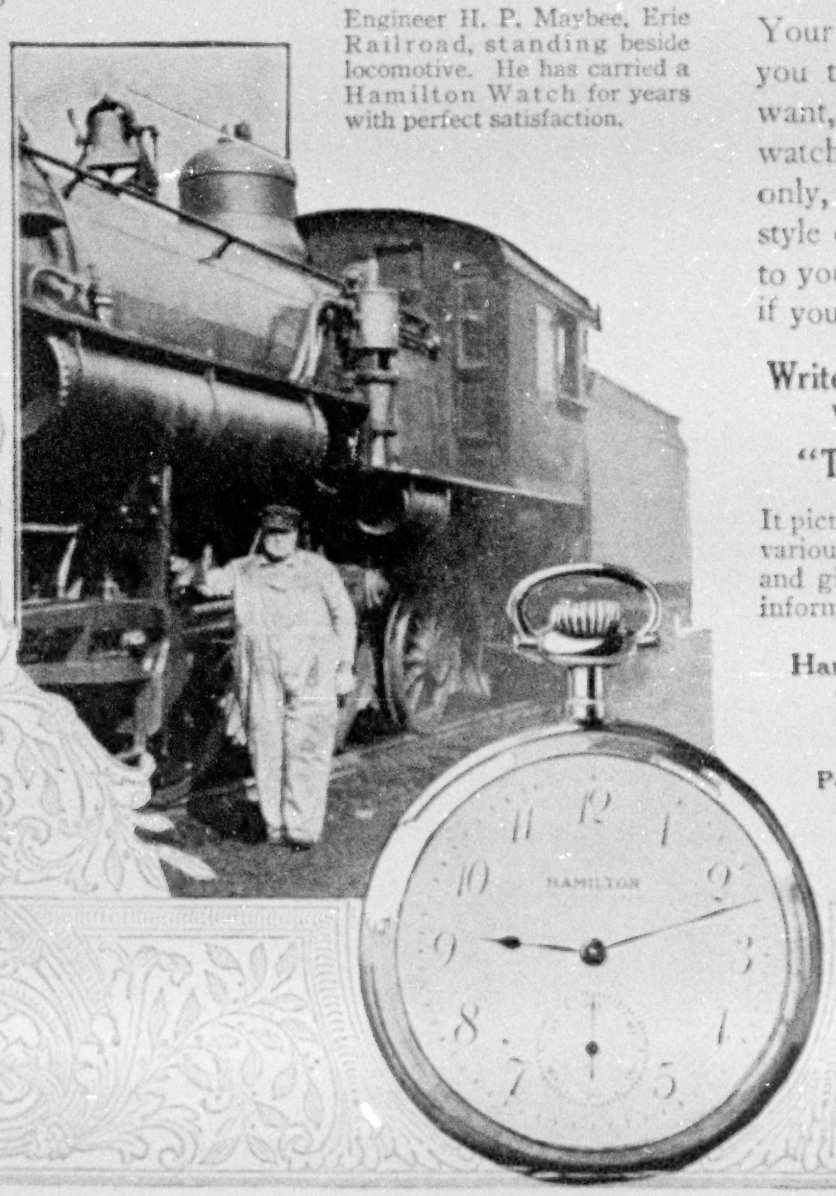

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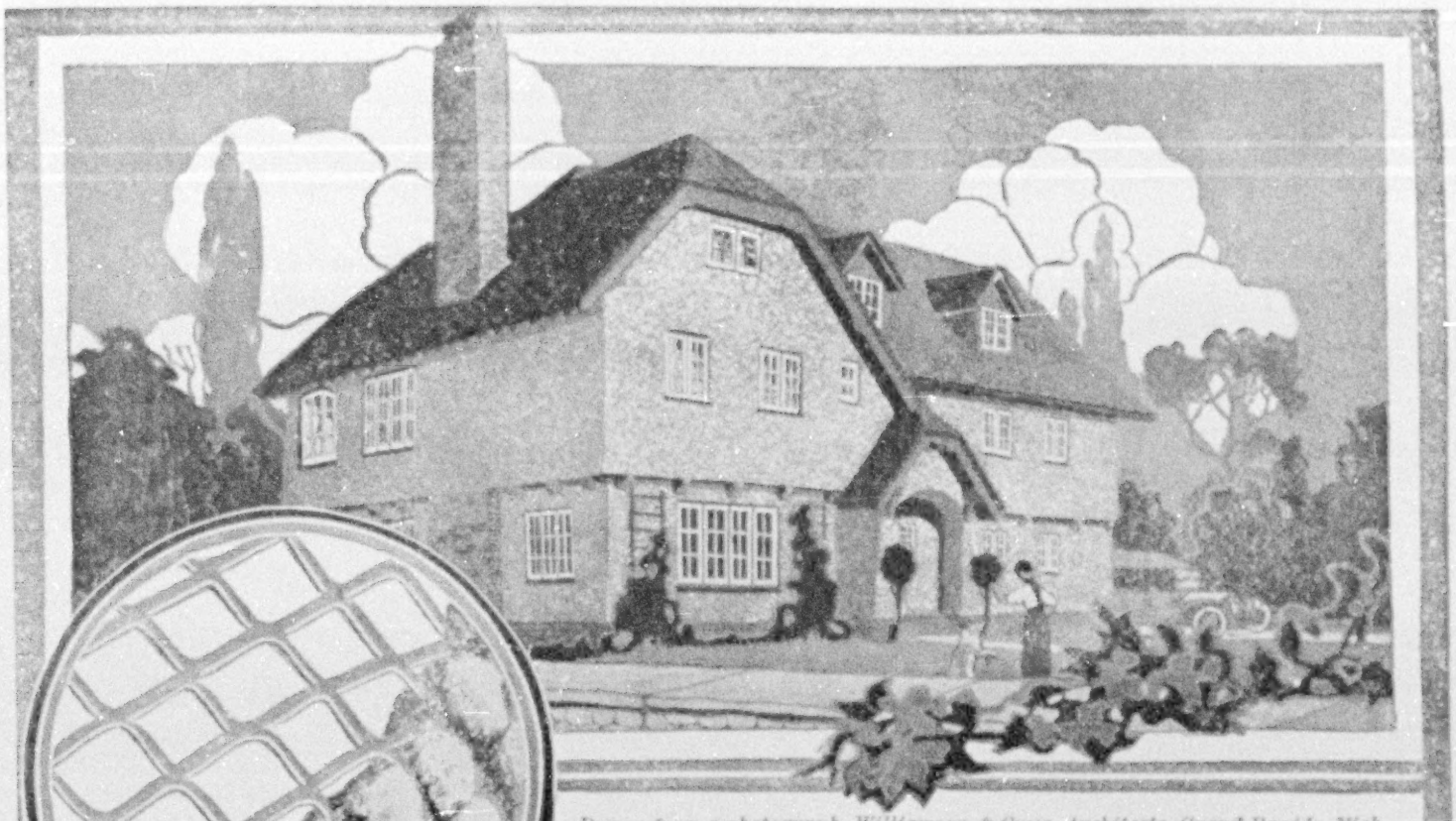

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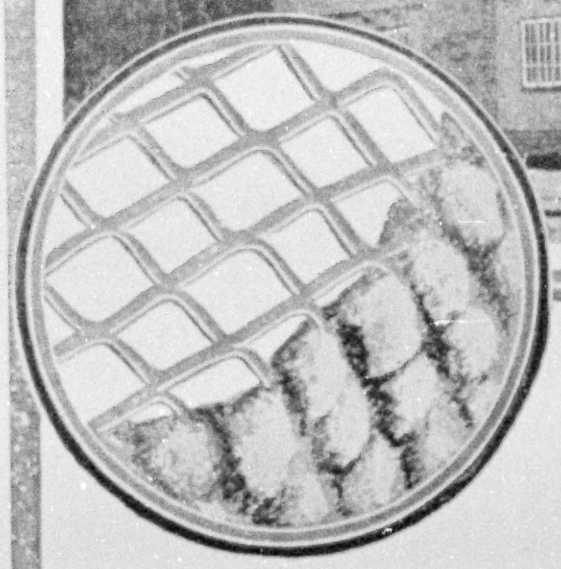

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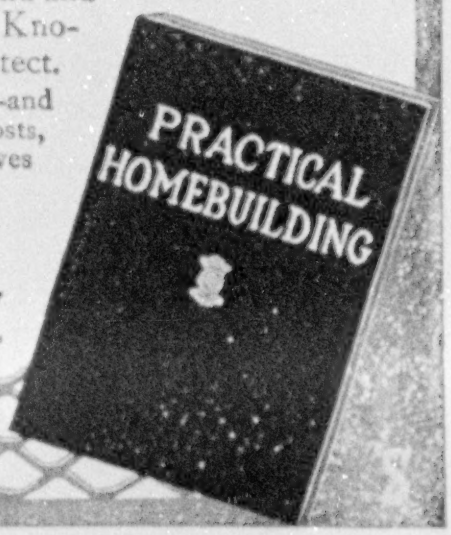

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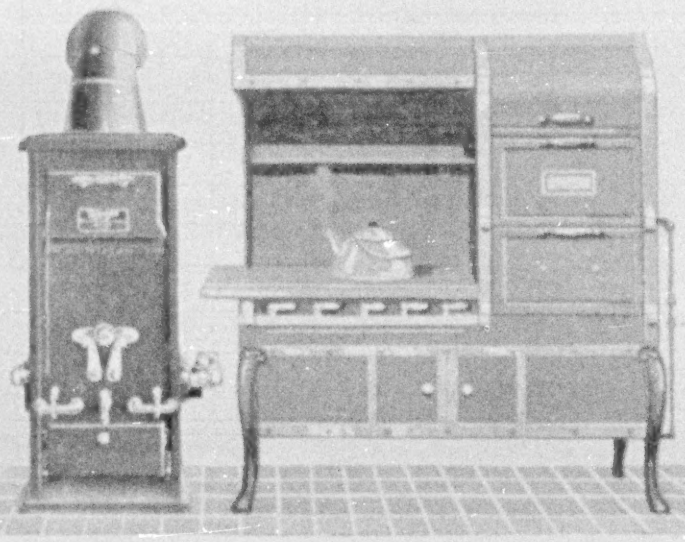

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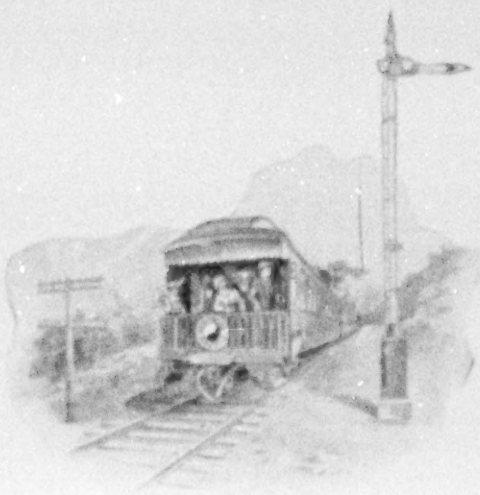

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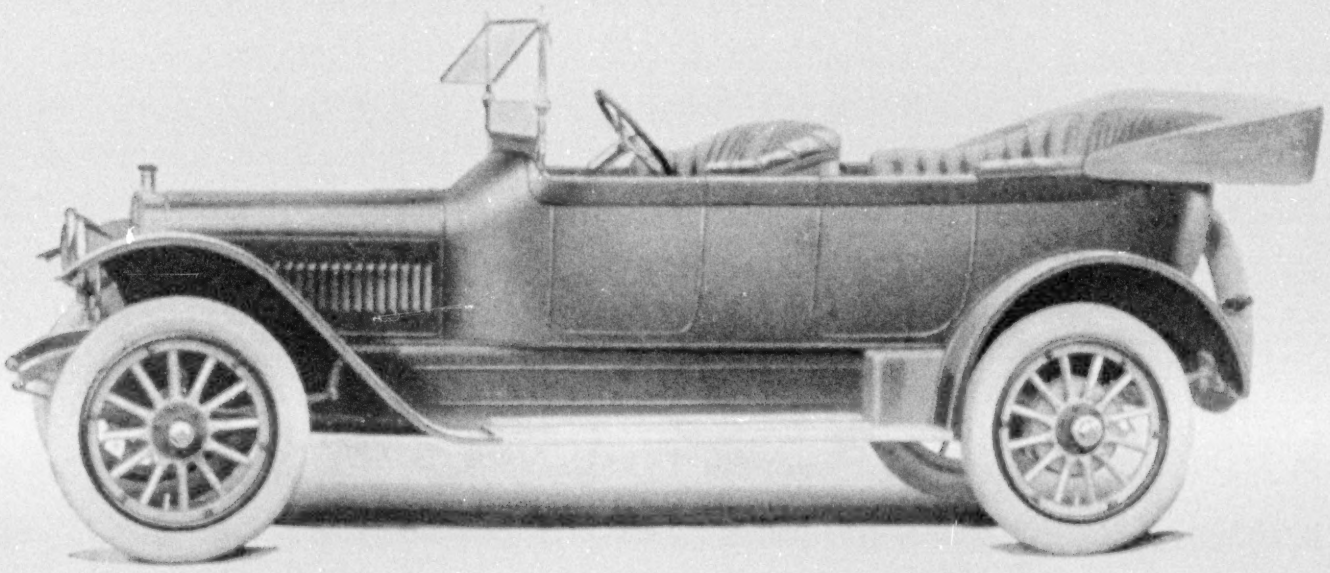

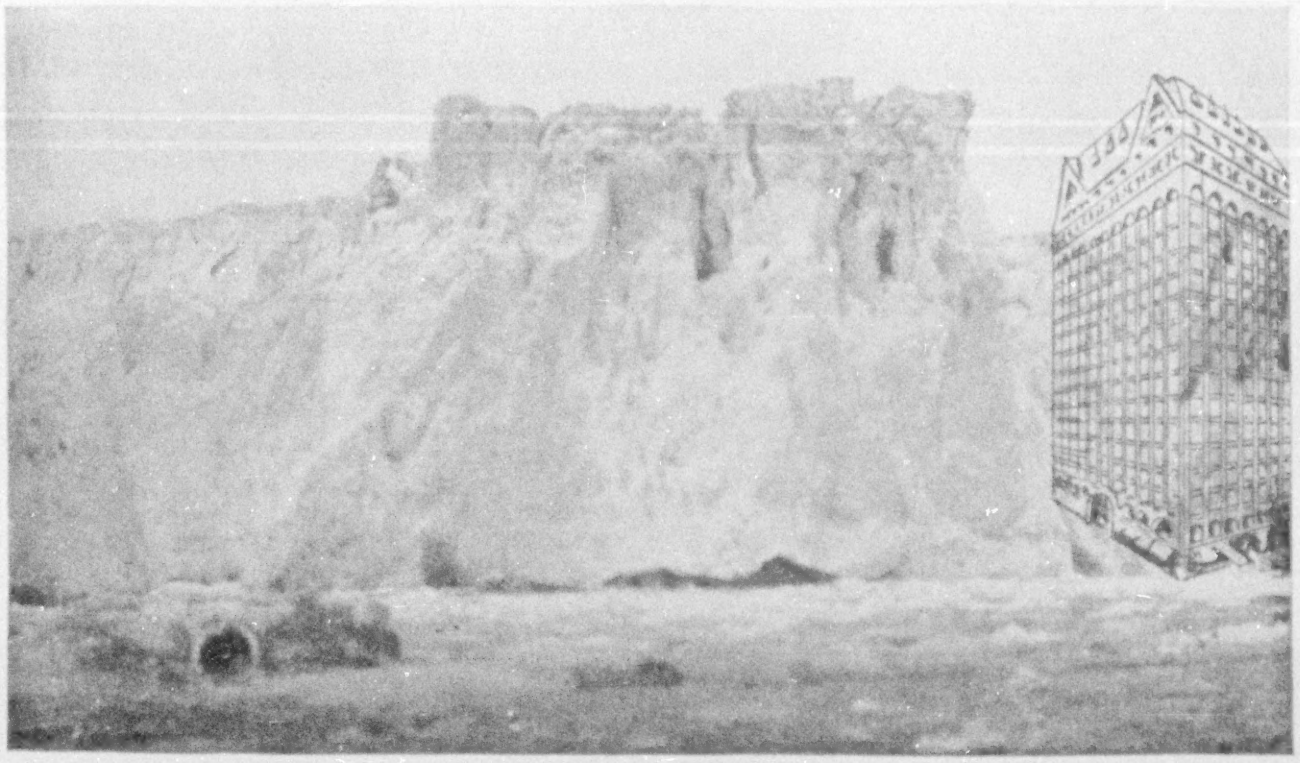

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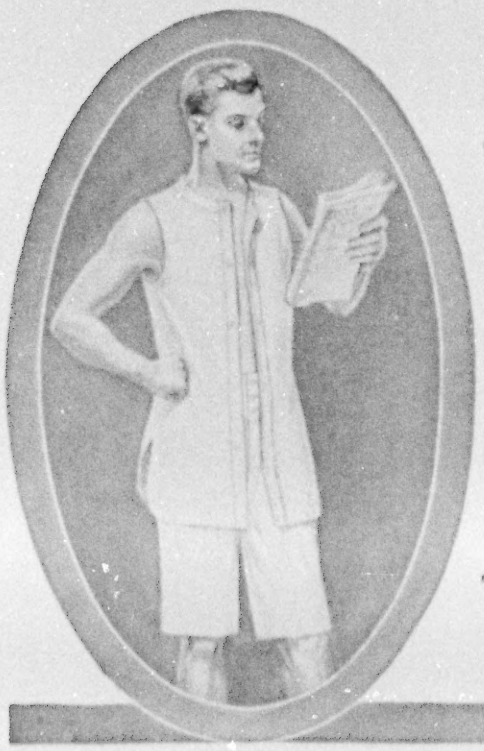

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VOL. XXVI, No. 1 WASHINGTON JULY, 1914

THE NATIONAL GEOGRAPHIC MAGAZINE

HUNTING WITH THE LENS

By Howard H. Cleaves

With Photographs by the Author

NOT long ago one of our foremost ornithologists surprised me by remarking that, in his opinion, the work of bird protection in this country had been carried to an extreme! He pointed out that every great bird student, to his knowledge, had received his start by collecting eggs and making up study skins, but that the doing of these things lies beyond the reach of the present-day lad by reason of the strictness of the law.

I ventured to suggest that most of the famous ornithologists had made their beginnings before the era of the camera and the inexpensive field-glass, and that through these instruments as mediums the youth of the twentieth century can develop and maintain as deep an interest in bird life as his counterpart of a hundred years ago was led to do as a result of collecting.

As a matter of fact, this is an age of popular interest, and is getting to be one of conservation as well. The scientific specialist will ever be with us, and it will always be possible for him to secure necessary material for his intensive studies; but to open the way for every one in the land to destroy such quantities of wild creatures as might be deemed essential to develop within him the foundation for a scientific career would be a decided mistake. It were better to have fewer scientists and more birds.

Not, after all, that those truly interested in research have made any appreciable inroads on the bird population—although Audubon himself, in telling of his Florida episodes, says: "Each of us, provided with a gun, posted himself behind a bush, and no sooner had the water forced the winged creatures to approach the shore than the work of destruction commenced. When it at length ceased the collected mass of birds of different kinds looked not unlike a small haycock"—but laws which are left loose for a worthy purpose are certain to be taken advantage of by the greedy and unscrupulous.

This account and the accompanying pictures are submitted to the reader with the special purpose of emphasizing the truth of the already oft-repeated contention that it is more glorious and profitable to shoot birds through a lens than through the bore of a gun. The photographs are all of birds to be found in eastern North America, and might have been secured by any person with standard photographic equipment and a fair supply of energy and patience.

DIFFERENT TEMPERAMENT IN DIFFERENT BIRDS

The infinite variety of problems that must be met and overcome in securing photographs of wild birds under natural conditions should appeal to any one who has even a spark of ingenuity. The mode of procedure applied successfully to one subject may fail completely in the case

Photo by Howard H. Cleaves

A "TURTLE CRAWL": RACCOON KEY, BULLS BAY, S. C.

The female turtle drags herself up the beach above high-water mark after dark and digs a nest, where, according to the age and size of the turtle, from 75 to 200 eggs are deposited at a single laying.

of another. In this event a new course must be devised, and if this fails a third must be resorted to. It keeps one's wits on the move and *compels a close study of the habits and idiosyncrasies of the numerous birds which one meets;* and this, after all, is the true end to be gained and desired.

The difference of temperament in different birds and, moreover, in different individuals of the same species can best be illustrated, perhaps, by the following incidents:

The first was furnished by a yellow-billed cuckoo. She had her nest in a dense piece of woodland and placed near the top of a seven-foot bush, beneath a canopy of leaves, which, together with the shade of the forest, produced wretched light conditions for photography.

The time was late afternoon, and before the old bird came back to the nest, with the corpulent caterpillar of a hawk moth for the two young cuckoos, an electrical storm had obscured the sun entirely, and the rumblings of thunder made it apparent that camera, tripod, and all would soon have to be withdrawn or be drenched. But the young cuckoos were so far developed that they would be out of the nest by the following morning; so, if a plate were to be secured of the old bird beside her young, it was plain that it must be exposed within the next five minutes or not at all.

As this crisis was reached there occurred a movement at the far side of the bush and in an instant the old yellow-bill was standing at the edge of the nest, her tail drooping and head turned to one side. The shutter had been set for a time exposure and the thread leading to it was given a cautious pull.

At the opening click the old bird's head turned slightly; but from that moment until the remarkable exposure of 57 seconds (made necessary by the light conditions) was brought to an end by a second snap of the shutter spring, the cuckoo remained like a statue, and the resulting photograph was fairly satisfactory. Such a course could not have been followed with a less passive and apparently stupid bird than the cuckoo.

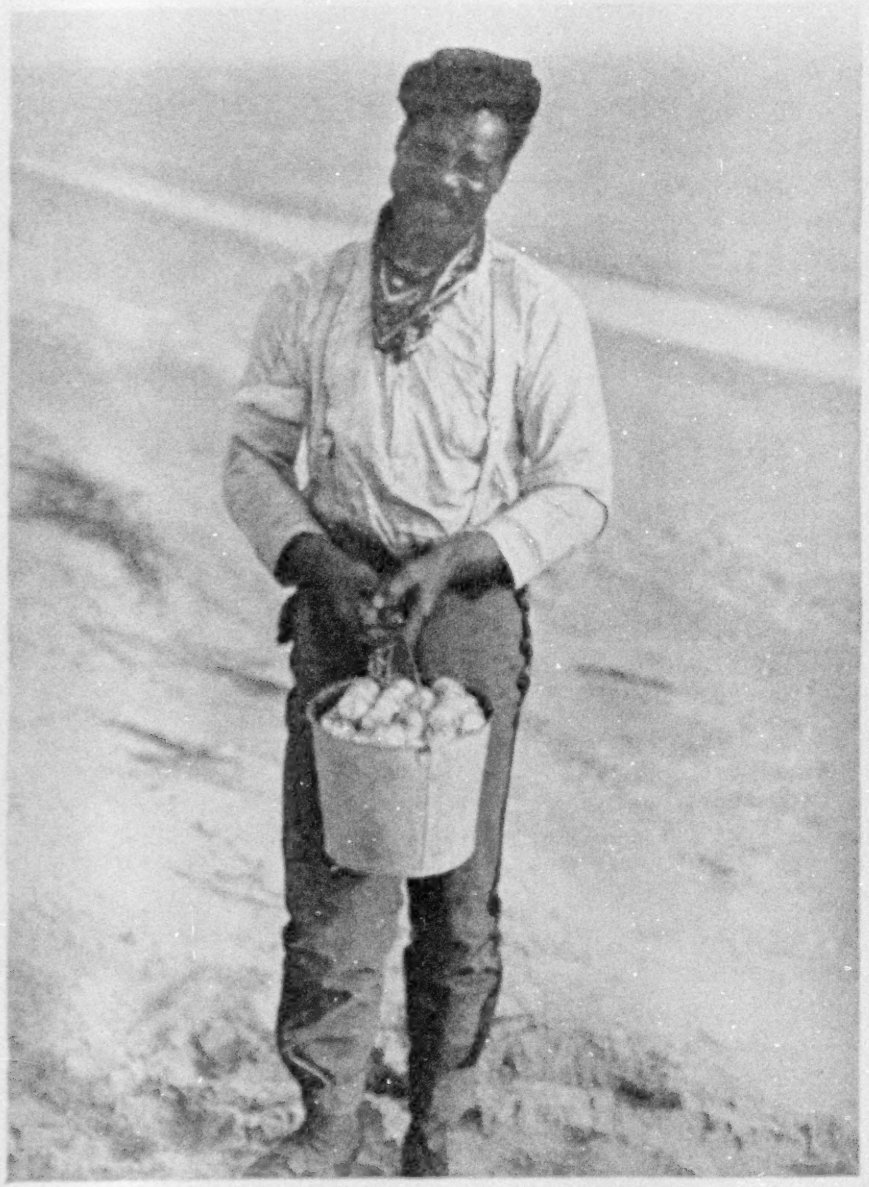
Photo by Howard H. Cleaves

GATHERING THE EGGS OF THE TURTLE

The turtle usually comes ashore in late May or early June and deposits her eggs in a hole she digs in the sand. She lays an enormous number, ranging from fifty to a thousand, according to her size, scoops back the sand, and returns to the sea, never again bothering about her eggs. If these are undisturbed, they hatch in from six to eight weeks. The baby turtles have to shift for themselves, and as soon as they are hatched they seek the water; but they are not willing to risk themselves in the open sea until they have developed their powers of navigation in some shallow inlet. In gathering the eggs, the exact location is first determined with a stick; then the egger digs through two feet of moist sand to the top layer of eggs. The sand is allowed to cling to the shell until the egg is about to be cooked.

My friend and fellow bird photographer, Mr. Clinton G. Abbott, had an experience with a cedar waxwing which illustrates this point. The nest was located in a shady place, necessitating the taking of time-exposures only. But the bird was nervous and turned her head each time at the click of the shutter, producing only a blur where her head should have been and spoiling plate after plate. The clever photographer overcame the difficulty by hanging an alarm clock beneath his camera. The waxwing soon became accustomed to the sound of this instrument and a perfect photograph was secured, for when the thread was pulled to make the exposure the "clicks of the shutter intermingled perfectly with the ticks and tocks of the clock."

One soon discovers that there is a vast variation in the dispositions of different individuals of the same species. In working with the fish-hawks on Gardiners Island we found that some returned to their eggs or young almost as soon as one had disappeared within his umbrella



THE "HAUL" FROM THE TURTLE'S NEST (SEE PAGES 2 AND 3)
A TOTAL OF 136 EGGS

The native eggers peddle these turtle eggs in the streets of Charleston and Georgetown (S. C.) for 12 to 15 cents per dozen. They are considered a great delicacy by the natives, although the author found the flavor and texture to be quite disagreeable.

Photos by Howard H. Cleaves

There is still much work left for the Audubon societies and the Federal government to do. It is supposedly illegal to take the eggs of wild birds in Virginia, and yet each day for a month or two the eggers go off to the nesting islands and rob the nests of the sea-birds at Wreck Island, Va.

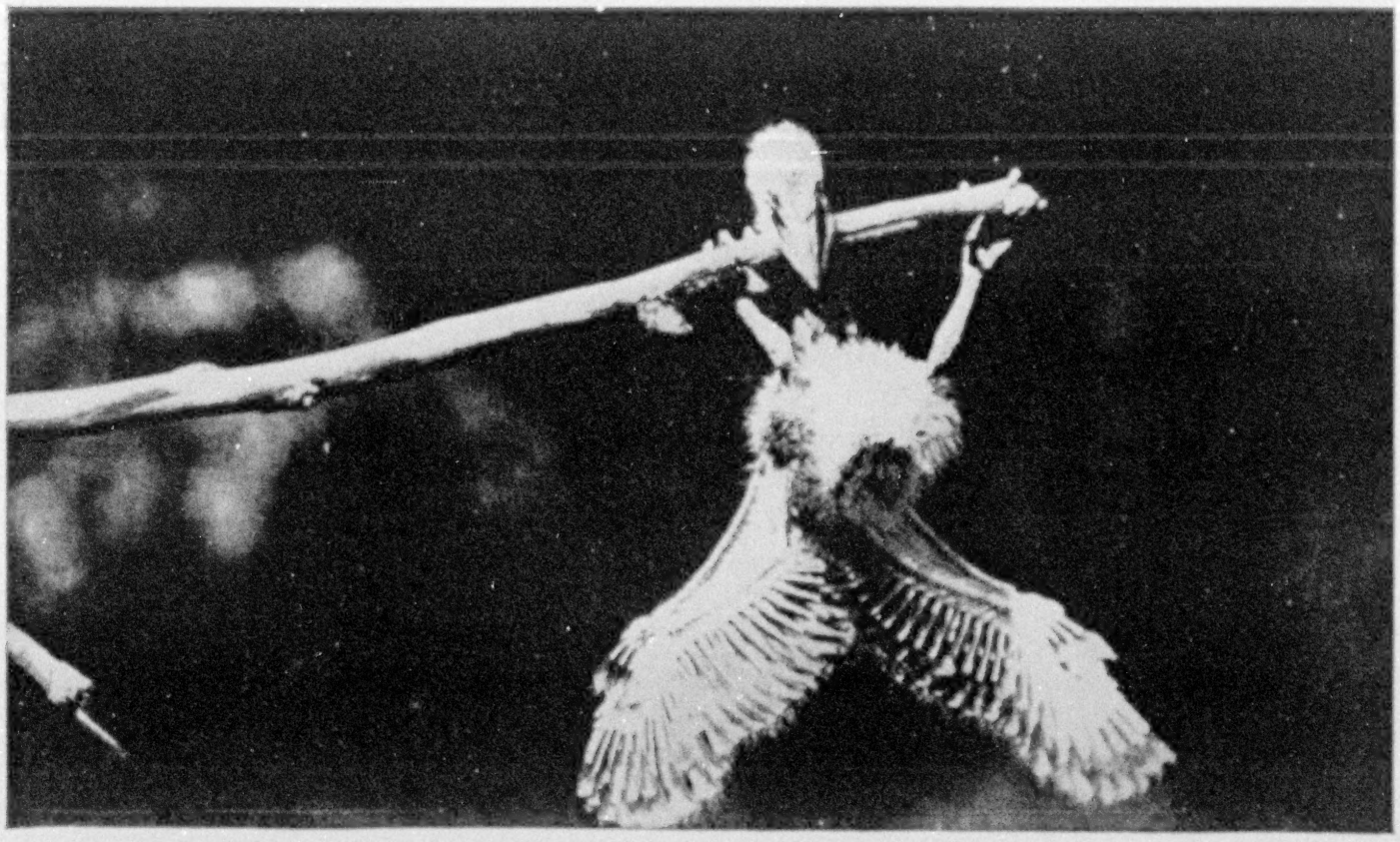
A PIPING PLOVER AND YOUNG "PERMITTED A SURPRISING DEGREE OF FAMILIARITY": MARTHAS VINEYARD, MASS.

"By simply holding the camera in my hands and standing in the open, without concealment of any kind, I was able to photograph the bird as she approached her nest and brooded her newly hatched young" (see text, page 8).

PIPING PLOVER

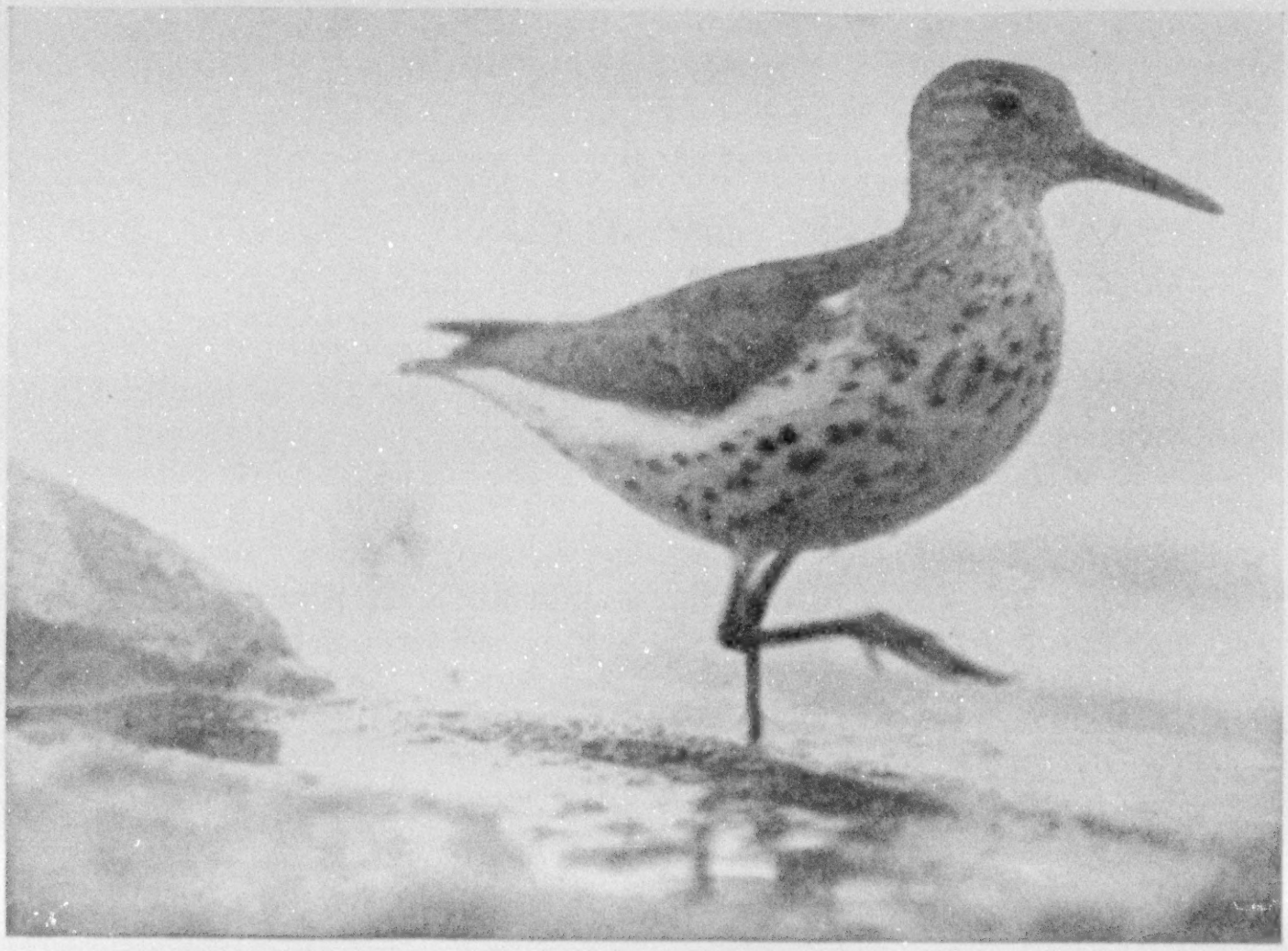
Photos by Howard H. Cleaves

"Proved herself to be the most devoted shore-bird mother that I had ever met. . . . I put my hat over the nest in the absence of the old plover, and was nearly convulsed by watching the 'circus' when she returned. . . . To hear her offspring and yet not be able to find or see them was quite inexplicable. Round and round the hat she ran, piping away in the meantime and now and again stopping to listen—a peep from a youngster being sufficient to start her off again" (see text, page 10).



A YOUNG GREEN HERON REGAINING HIS BALANCE ON A PERCH

The dark patches at either side of his head are not the eyes, but the inside of the mouth, illustrating the spring-like character of the lower mandible



Photos by Howard H. Cleaves

ONE OF THE "BEACH PATRGL"; SPOTTED SANDPIPER

A bird easily photographed near home—a common nester in the eastern United States

COMING IN SWIFTLY FOR A STRIKE FROM THE REAR, TALONS LOWERED READY FOR INSTANT ACTION

"It is only necessary, then, to secure a stuffed owl and place it on a perch in some open site in order to 'start something' in the bird world. And by concealing one's self near by in a blind, either of the umbrella variety or of some natural objects, such as corn-stalks, cat-tails, etc., the onslaught may be witnessed and photographed to advantage" (see text, page 12).

Photos by Howard H. Cleaves

A VICIOUS JAB, DEMONSTRATING THE REACH OF A HAWK'S LEGS

Here, as in most of the photos in this series, the owl happens to be in a horizontal position, into which shape he was knocked by the hawk

Photo by Howard H. Cleaves

THE RED-SHOULDER TEARING AWAY THE SIDE OF THE DECOY

The hawk's wings far forward at the "top" of a stroke and tail spread like a fan. Several *crows* show in the distance on the wing (see text, page 13)

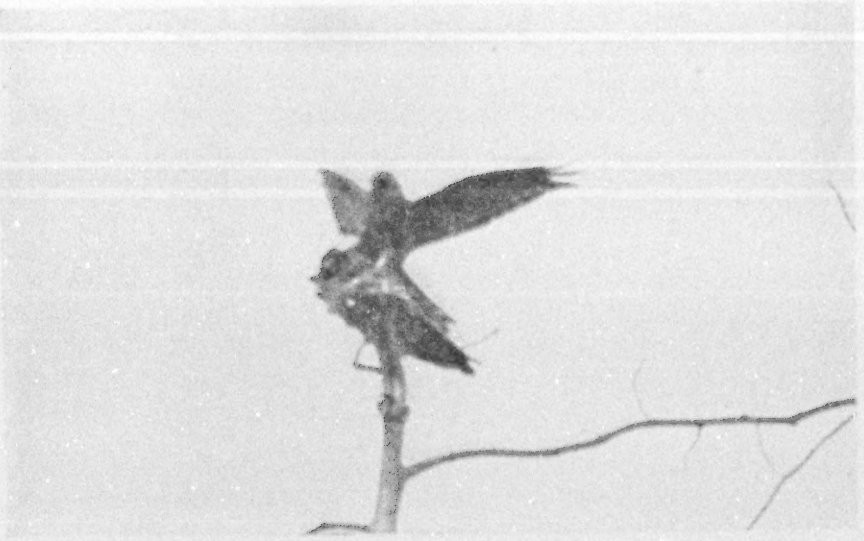
blind, while others, under precisely the same conditions, proved to be decidedly skeptical and required an hour or more to become reconciled. And now and then a hawk would be accommodating for a time, but would suddenly, without apparent reason, go off and refuse to return so long as the blind was near.

AMUSING EXPERIMENTS WITH A PIPING-PLOVER

I recall working the better part of an afternoon trying to photograph an old piping-plover at her nest without success; but a couple of years later, on a different portion of the coast, I came upon a breeding piping-plover that went to the other extreme and permitted a surprising degree of familiarity. By simply holding the camera in my hands and standing in the open, without concealment of any kind, I was able to photograph the bird as she approached her nest and brooded her newly hatched young.

Not being content with this, I put my hat over the nest in the absence of the old plover, and was nearly convulsed by watching the "circus" when she returned.

She came unerringly back to the nest-site, which perhaps she recognized by the two familiar tufts of beach grass, one of which stood on either side of the nest; but here between them was a peculiar hillock that had grown up during the



AN ATTACK FROM THE SIDE

Photos by Howard H. Cleaves

THE MOUNTED BARRED OWL AFTER THE FRAY

Showing one eye hanging by shred of cotton, hole over the eye, and large rent in bird's side where excelsior is exposed

Photo by Howard H. Cleaves

BELLOWING OVER THE LAKE TO HIS MATE

brief time that she had been away. She came to a dead stop three inches from the brim of the hat and fluffed out her feathers indignantly, at the same time uttering a series of plaintive, piping whistles. This brought forth a muffled response from the young, and instantly the old bird became highly excited.

To hear her offspring and yet not be able to find or see them was quite inexplicable. Round and round the hat she ran, piping away in the meantime and now and again stopping to listen—a peep from a youngster being sufficient to start her off again.

At length the limit of patience seemed to be reached, for instead of circling longer about the obstruction the mother plover headed straight for it, pushing against the upturned brim with her breast and pecking at the material in the crown as if to remove the frightful object. Had there been any purpose in further extending the experiment I should not have had the heart to do it; but there was none, and the hat was removed from the nest and put in its proper place. The little piper had proved herself to be the most solicitous shore-bird mother that I had ever met.

USING AN OWL FOR BAIT

In seeking to procure bird photographs one should mark carefully the several factors which go to make up the bird's life—his food habits, time and manner of nesting, habitat in winter, and even his roosting place by night, his favorite perch by day (if he has one), and any peculiar whims, likes or dislikes, which happen to characterize his kind. Being possessed of an understanding of these things is identical with having success within one's grasp, if bird photography is the aim.

The simple knowledge, for instance, that hawks, crows, jays, and many other of the land birds are the sworn enemies of the owls is sufficient to put one in a position to conduct a highly entertaining experiment and one which is likely to produce a series of striking photographs. The reason that so many birds display

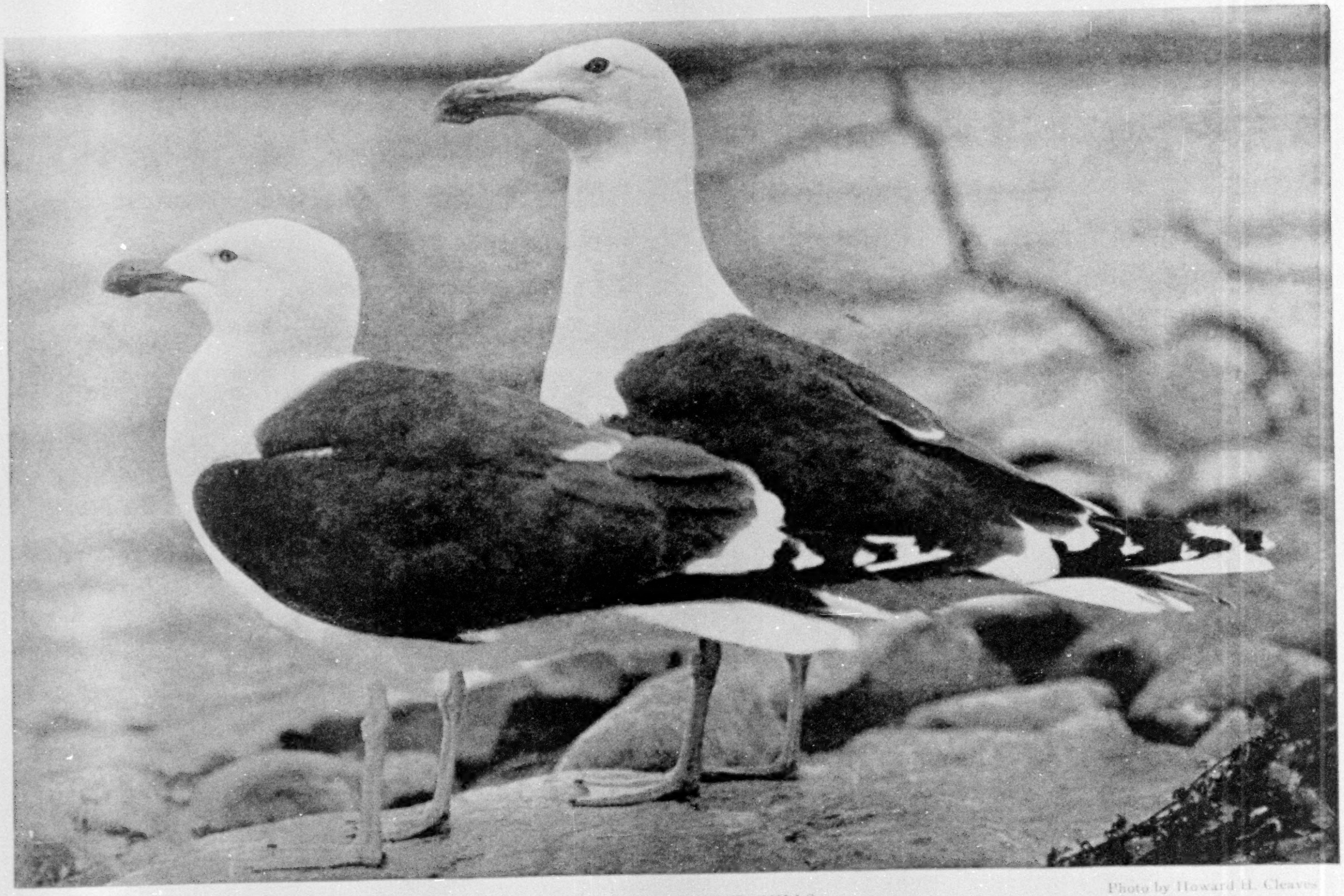


Photo by Howard H. Cleaves

GREAT BLACK-BACKED GULLS

Responding to the call, the other bird swims ashore and the pair stand together—the very picture of devotion and contentment. The old birds are very fond of each other

Photo by Howard H. Cleaves

THE "STAMPING GROUND" ON NESTING ISLAND IN LAKE GEORGE

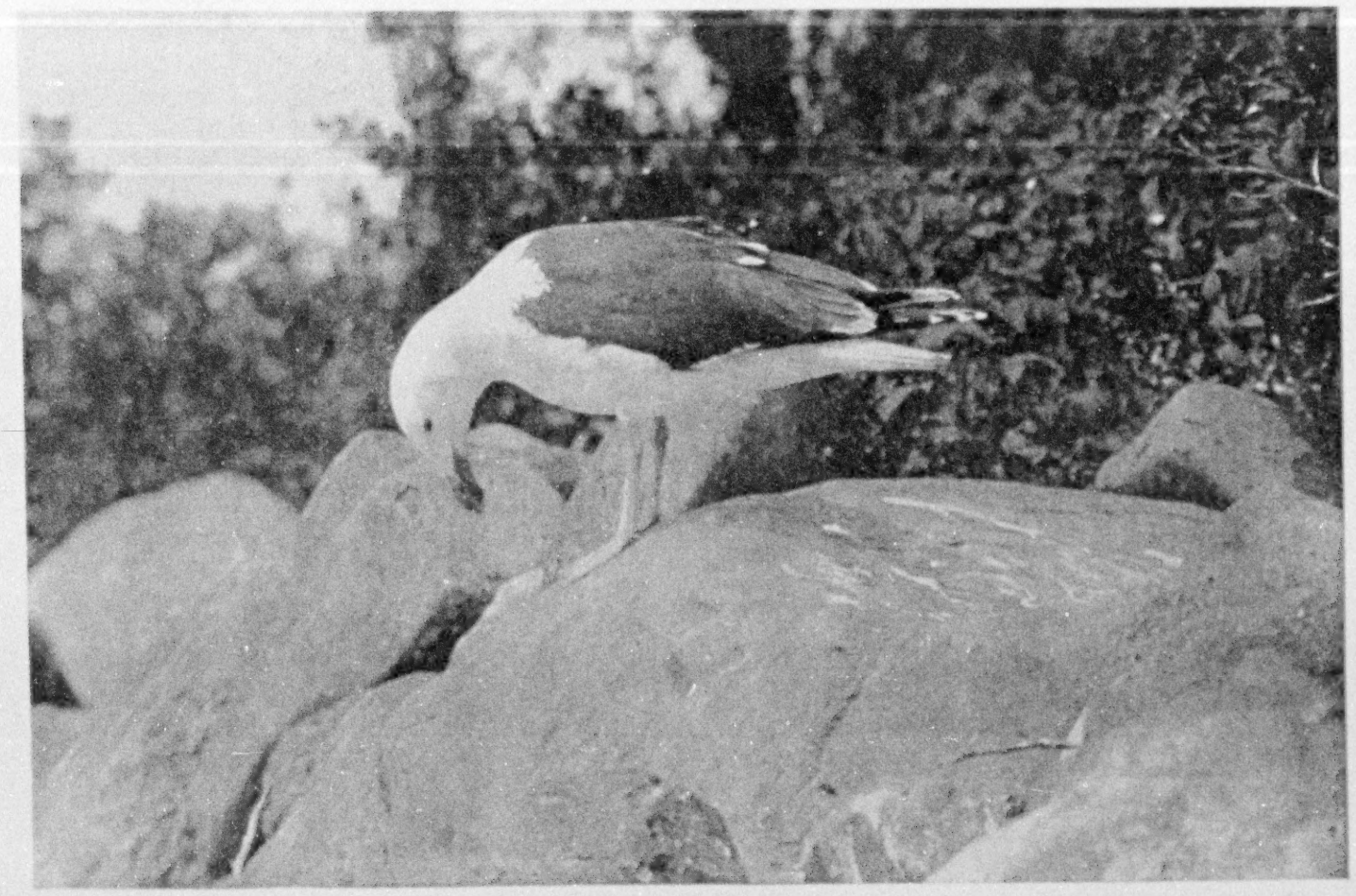
Here the gulls preen, feed their young, play, and sleep; also a trail (open space in bushes) where birds walk to and from the shore of the lake. The grass has been torn up by the roots and trampled under foot to keep the space clear.

this deep antipathy toward owls is probably that the nests of the former are occasionally rifled during the night by the latter, and at times the owl actually captures roosting adult birds, as their feathers found in the owl's nest-cavity or daytime retreat would testify.

It is no wonder, then, whenever an owl is so unfortunate as to be driven into a conspicuous position during the hours of light that some jay or crow or catbird should break loose with a series of terrible curses at the top of his lungs, and thus call together a bevy of irate confederates, who proceed to mob the poor bird of the night.

It is only necessary, then, to secure a stuffed owl and place it on a perch in some open site in order to "start something" in the bird world. And by concealing one's self near by in a blind, either of the umbrella variety or of some natural objects, such as corn-stalks, cat-tails, etc., the onslaught may be witnessed and photographed to advantage. An account of one or two of the writer's experiences with a mounted owl may be of interest.

I had been rambling through some marshes near the quaint old village of Keyport, New Jersey, and chanced to fall into conversation with an old fisherman who practiced taxidermy as an avocation. It is always well to look over the mounted specimens in possession of these isolated naturalists, for an Eskimo curlew, passenger-pigeon, or some other rarity may be found perched on a bureau, sideboard, or mantelpiece. There was just one bird in the fisherman's collection that interested me, and this was a barred owl which gazed out over the room from his position on top of the grandfather's clock. I wanted that owl. My host protested, saying that the specimen was falling apart, due to age, and asked if I wouldn't care for some other mount. But I insisted that I cared only for the owl, and at last its owner wrapped up the shabby-looking bird and apologetically accepted a dollar for it.



ADMIRING THEIR OWN FEET Photo by Howard H. Cleaves

This was a failing among the black-backs. It was often done after the preening was completed

With new eyes and a change in posture, the owl looked like the real, living thing; indeed, it worked almost too well when put out for the experiment. The dummy was perched prominently on a side hill, and with a companion I crawled beneath a canopy of pine boughs and gave a few scolding crow-calls to bring on the vanguard of the mob.

SAVAGE ATTACKS BY A HAWK

Like magic, fish-crows and common crows appeared on the scene, seeming to come from every point of the compass. They formed themselves into a croaking, cawing, swirling spiral and heaped their wrath upon the immovable barred owl on the side hill below.

Soon a red-shouldered hawk sailed smoothly out from a woodland to investigate the row. On sighting the owl he broke into rapid flight and went screaming at the head of the poor wretch.

The uproar had reached its height and one photograph had been made when suddenly the hawk left the scene, and the crows, with a few sharp caws, faded into the distance. Looking from the blind, we perceived a bare-headed woman and her son racing toward us through thickets and brambles, and when we stepped forth and the woman came up to where we stood she demanded to know what we were doing to the birds. It was a striking demonstration of the spirit of bird protection, even though our sport had been spoiled for the day.

The next time the owl was put up in a spot more remote from human habitation and with uninterrupted success. A fish-crow was the first to give the alarm, and presently there were fully 75 crows in the air and in trees close by. Care had been taken to put the dummy only a hundred yards from the nest of a red-shouldered hawk, and the male bird, who had been noted scouting about the vicinity, was not long in being attracted by the rumpus.

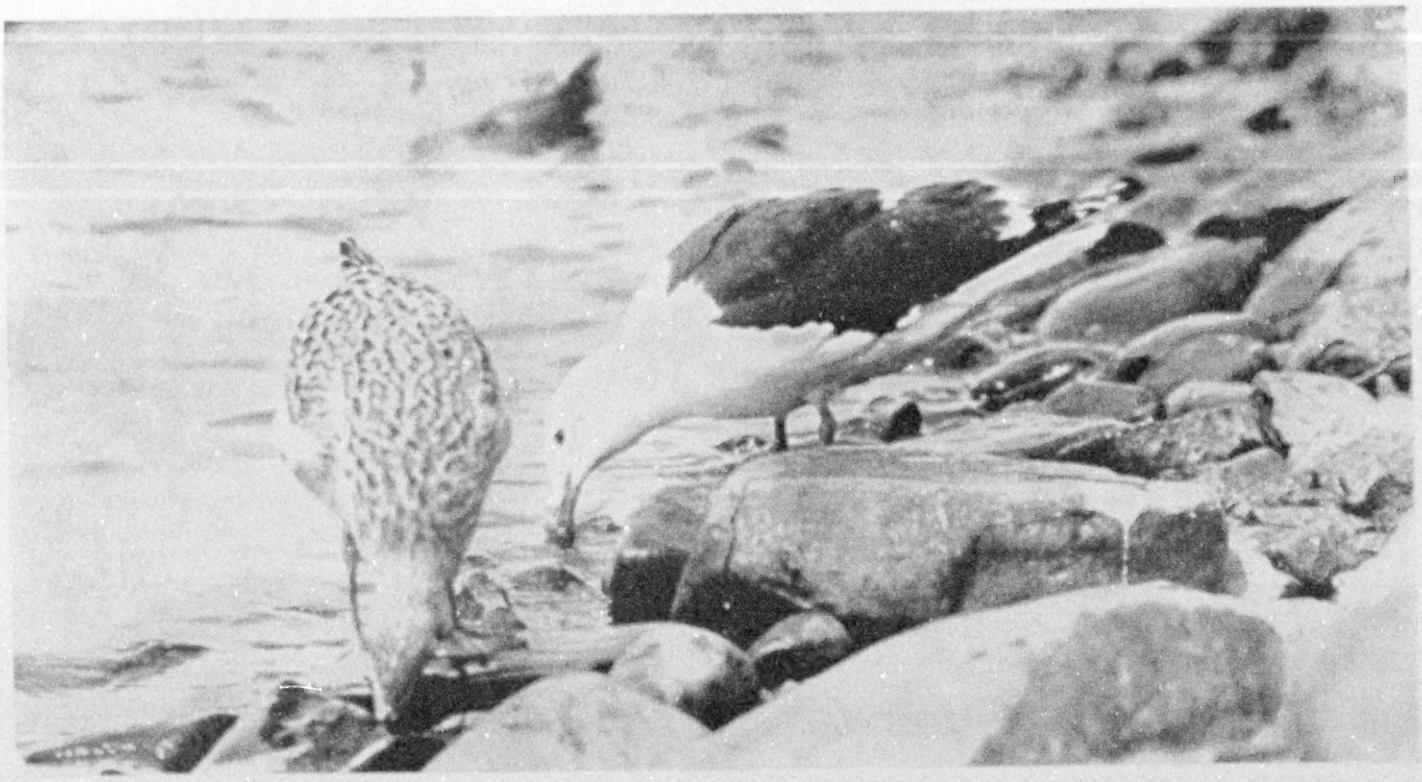
Strangely enough, this very hawk a few minutes before had been harassed by the crows, but in the presence of the new enemy the black raiders forgot these former differences; in fact, they were quite willing to resign in favor of the red-

Apparently possessing a fondness for play, the old black-backs now and then pick up a cast feather, a dead fern, or other object and carry it about. Note bird on left. A downy youngster is following at the right (foreground), begging for food.

Photos by Howard H. Cleaves

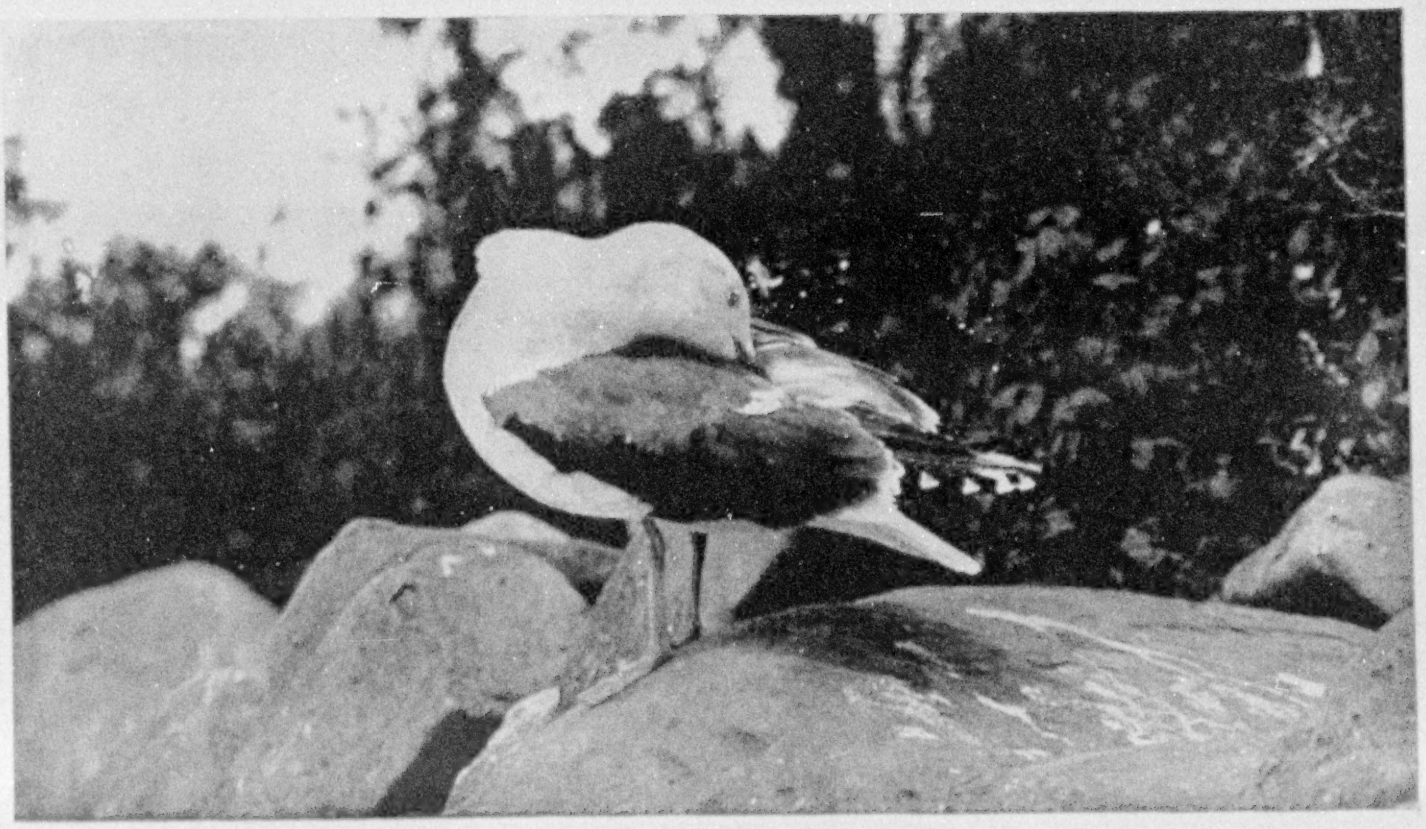
THE LONG-DELAYED MEAL IS AT LAST SERVED

Half-digested fish, captured in the Bay of Fundy or the ocean, are disgorged before the young gulls on the breeding islands in Lake George, several miles from the coast



THE OLD BIRDS ARE EXCEEDINGLY CLEANLY

They often wash their bills in the margin of the lake after delivering a meal. (Immature gull in foreground enjoying the remnants of a dainty morsel)



Photos by Howard H. Cleaves

BLACK-BACK PREENING RUMP FEATHERS, OR POSSIBLY REACHING FOR OIL SAC

Photo by Howard H. Cleaves

SKIMMER ON HER NEST, RESTING HER BILL ON THE SAND. NOBODY SEEMS TO KNOW WHAT PURPOSE THIS HABIT ANSWERS

Photo by Howard H. Cleaves

KILLDEER: THE SPOT SELECTED FOR THE NEST WAS IN THE CENTER OF A POTATO FIELD

The photographer may be dimly seen under the tree in the background, where he was pulling the thread

shoulder and remained perched about on dead trees, looking on at the assault.

The whole thing was strikingly like an arena battle, with the crows cawing and croaking approval and encouragement from their points of vantage while the furious and screaming red-shoulder dashed in at the non-resisting owl in the pit below. First the dummy got a whack on the back of the head and then in the face, and at each blow the air was full of feathers (see pages 8 and 9).

The hawk selected two perches—one to the east and the other to the west of the owl—and back and forth between these he flew, striking viciously at the enemy each time as he passed, occasionally wheeling and delivering a double-barreled blow before going on to his lookout. The owl was now knocked into an almost horizontal position by a strike from the rear, and now bent into a normal, upright attitude by an attack from the front; and there he would sit, solemn and erect, ready for the next rush.

Whenever the hawk lagged the least

Photo by Howard H. Cleaves

A "SEA-SWALLOW," OR COMMON TERN, MAKING A QUICK TURN; MUSKEGET ISLE, MASS.

bit in his attack he was instantly spurred on by a hooting which to him apparently seemed to come from the owl, but which really came from within the umbrella blind near at hand.

During the siege, which lasted for many minutes, eight photographs were secured and the dummy was the recipient of 19 head and body blows.

The poor owl was a sight when taken from the perch and cannot even be repaired for future use. Great tufts of excelsior protrude from his back and sides, one eye hangs an inch out of its socket by a mere shred of cotton, and the back of his head is entirely torn away, exposing wire framework and areas of staffing. But he has furnished more than a dollar's worth of fun (see page 9)!

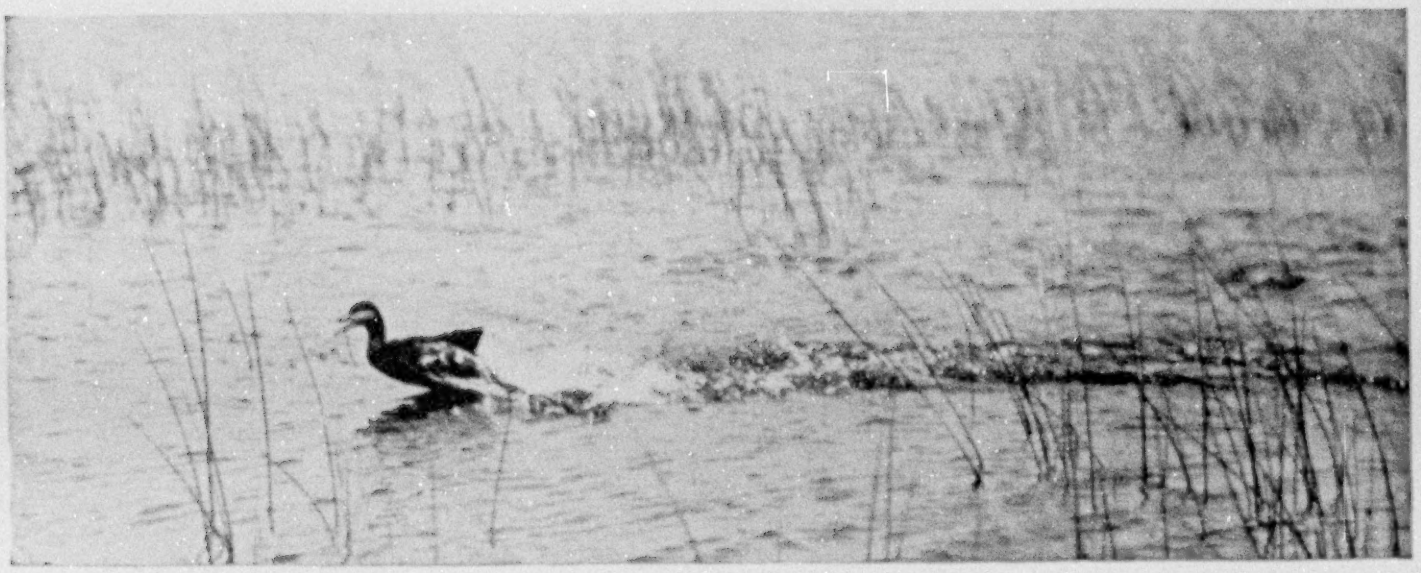
AN ARTIFICIAL GOLDFISH USED FOR BAIT

Perhaps the most carefully thought-out and "highly organized" bird photographic experiment on record (according to the assurances of friends) is that which the writer brought to a successful conclusion near his home on Staten Island, New York, on the 12th of April of the present year, when a fish-hawk, or osprey, was induced to plunge for an artificial goldfish. The details are presented herewith to the readers of the NATIONAL GEOGRAPHIC MAGAZINE.

First of all it might be well to have an understanding of the movements and feeding habits of the osprey, for these have a direct bearing on the case. This large hawk, having a wing-spread of about 5½ feet and being one of the commonest birds of prey in the coastal region, spends the winter in Florida, on the Gulf coast and southward, working up the Atlantic seaboard at the approach of open weather and reaching the vicinity of New York about the last week in March or the first week in April—very shortly after the ice has left our ponds, lakes, and rivers.

At this time the menhaden, or "moss bunker," the chief food of the fish-hawk and a fish which is familiar to all who have lived or visited near the ocean, has not yet migrated up the coast, and flounders and other salt-water fishes are not yet

BLACK DUCK, OR DUSKY DUCK, IN BREEDING GROUNDS, MARTHAS VINEYARD, MASS.
An anxious mother circling about us as we held her young



THE SAME "NIGGER" DUCK PRETENDING TO BE TERRIBLY WOUNDED
We were holding her young and whistling in imitation of their cry

Photos by Howard H. Cleaves

YOUNG BLACK DUCK "HYDROPLANING" ON BEING RELEASED
Mother, fully "recovered," in flight in upper left-hand portion of photo

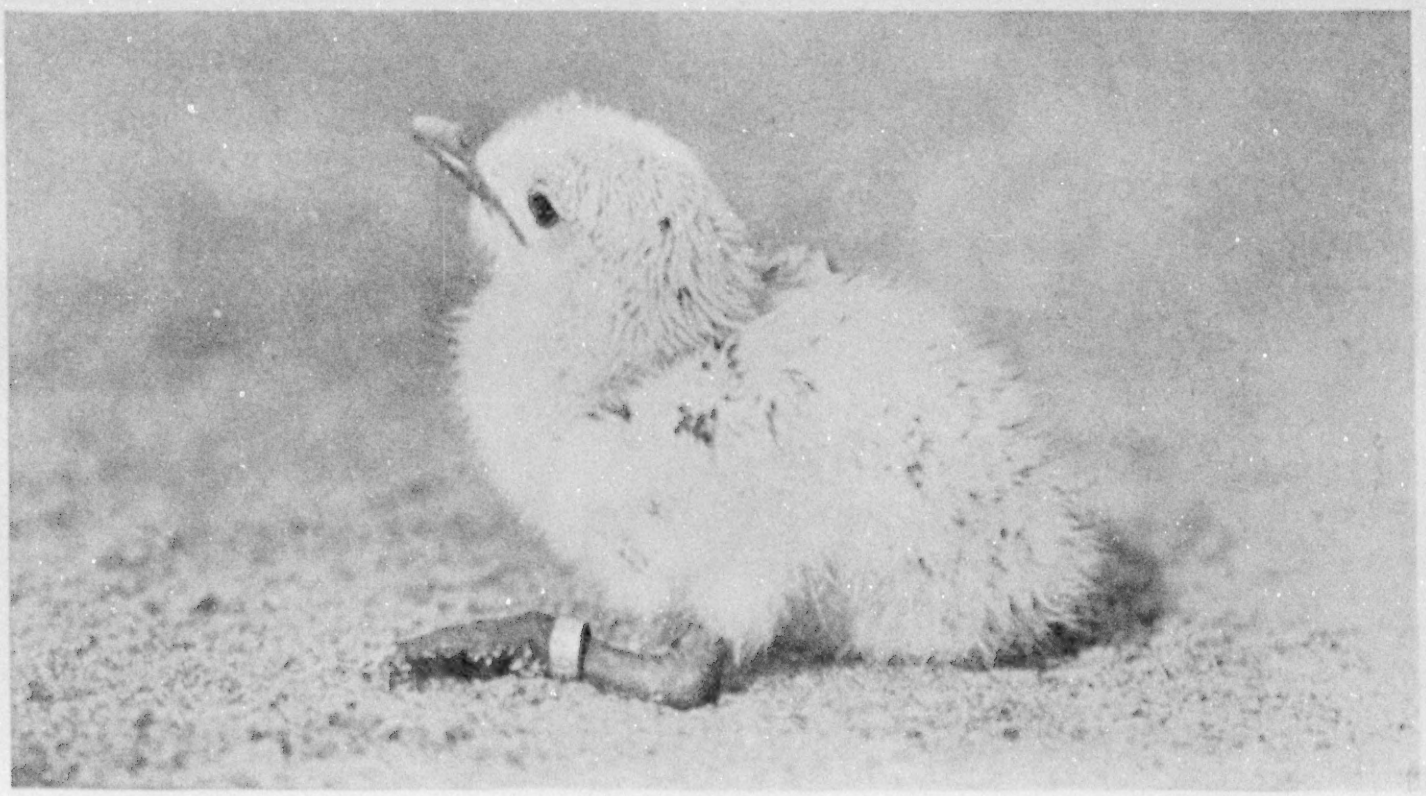
LAUGHING GULL ALIGHTING ON MARSH NEST: COBBS ISLAND, VA.

Photos by Howard H. Cleaves

LAUGHING GULL WHEELING: COBBS ISLAND, VA.

HAVE YOU HEARD OF THE BANDING OR RINGING OF WILD BIRDS?

This now wide movement is throwing light on the problems of migration, and especially on the movements of *individual* wild birds. (The author banding young black-backed gulls at Lake George, Nova Scotia. Note the camera and binoculars.)



Photos by Howard H. Cleaves

THE BABY ROYAL TERN WITH RING ADJUSTED: VESSEL REEF, S. C.

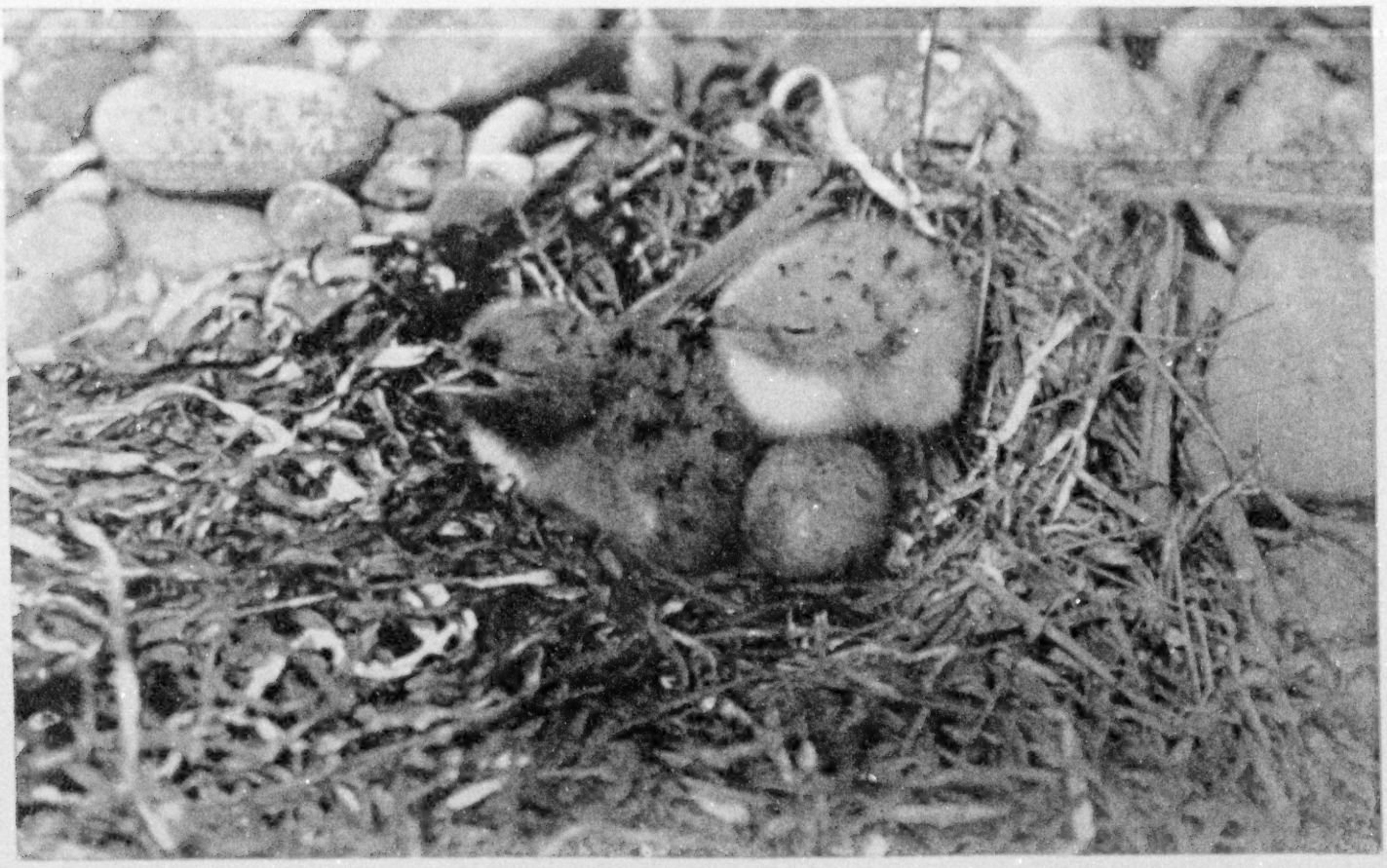
"Notify Am. Museum, N. Y.," is inscribed on each band, and there is also a serial number

Photos by Howard H. Cleaves

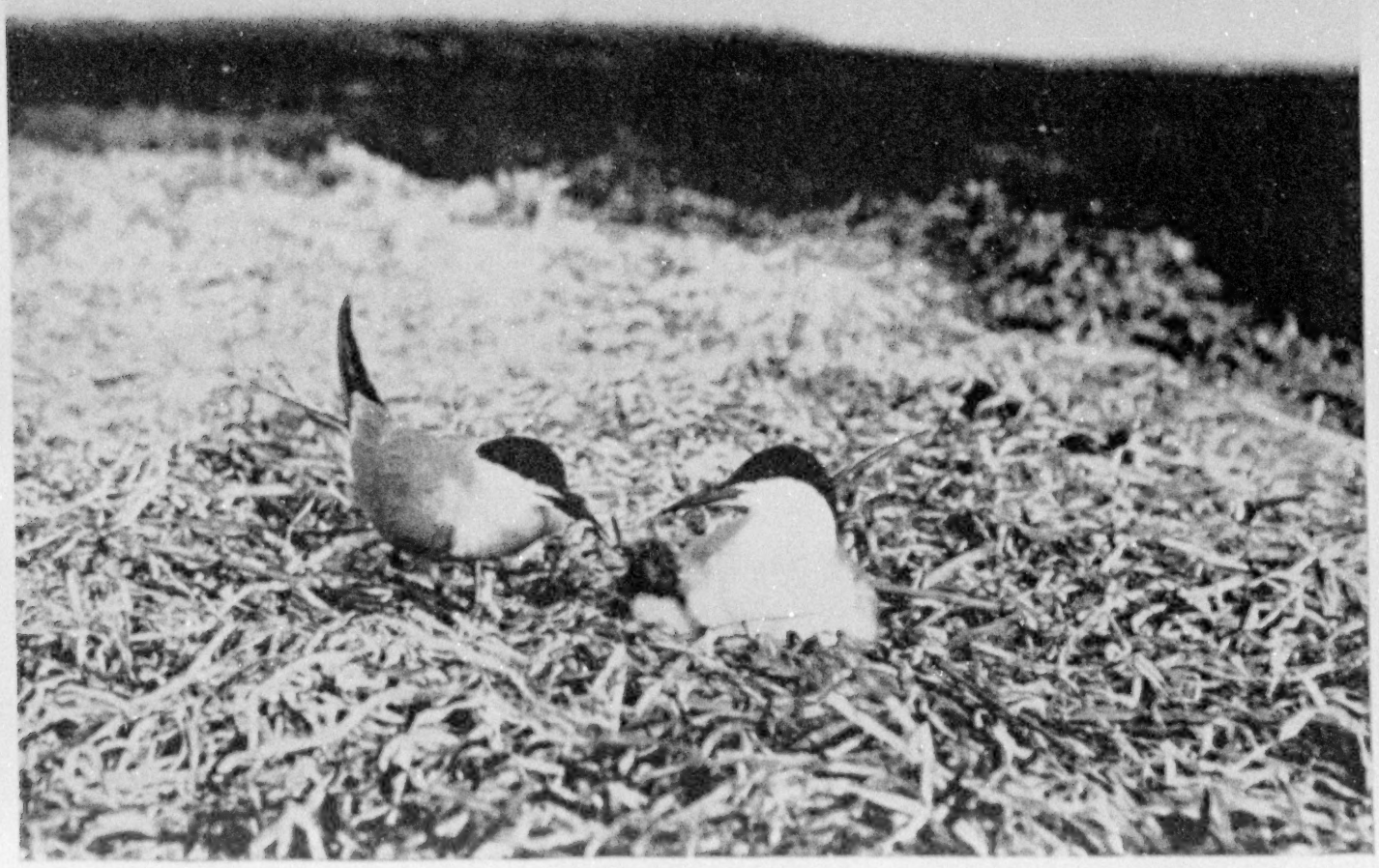
SHOWING A BAND IN POSITION ON THE FOOT OF A YOUNG BLACK-BACKED GULL

AN IRATE YOUNG LOUISIANA HERON: JUST BANDED

The author and his companion (Caspar Chisolm, of Charleston) ringed 80 herons of five species in a South Carolina rookery in 1913.



NEWLY HATCHED YOUNG OF COMMON TERN, OR SEA-SWALLOW; GARDINERS ISLAND, N. Y.



Photos by Howard H. Cleaves

A SCENE IN THE HOME LIFE OF THE COMMON TERN, OR SEA-SWALLOW: FEEDING YOUNG WITH A SAND EEL, MUSKEGET, MASS.

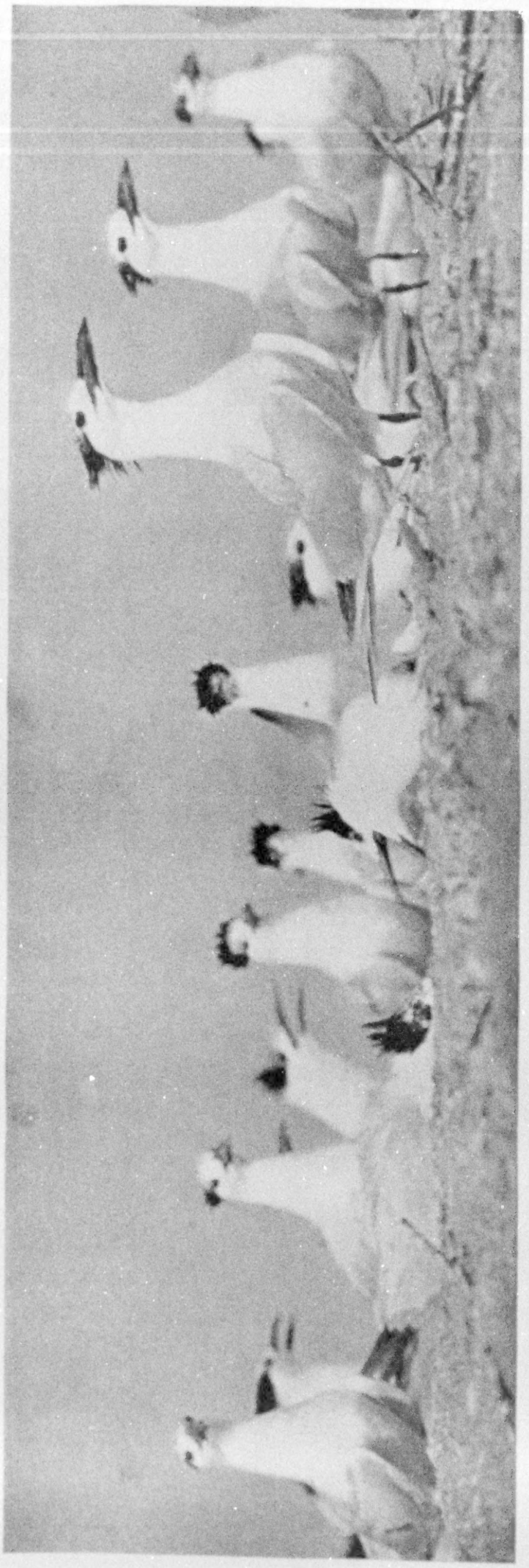
Photo and copyright by Howard H. Cleaves and Doubleday, Page & Co.

A SEA-SWALLOW; "WATCHING THEM SETTLE ON THEIR NESTS AS LIGHTLY AS GIANT SNOWFLAKES"

XUM

ROYAL TERNS, OR "BIG STRIKERS": VESSEL REEF, S. C. Photo by Howard H. Cleaves

"There is something overpowering and enthralling about standing beneath screaming, gyrating myriads of sea-swallows"



A PORTION OF ROYAL TERN COLONY: VESSEL REEF, BULLS BAY, S. C.
The two birds in center with heads lowered are quarreling over "boundary rights"
Photo by Howard H. Cleaves

wholly available. The invariable result is that the hawks, for at least three weeks after their arrival from the South, hunt almost exclusively in fresh water — chiefly ponds, where golden carp, German carp, and perch are taken. The first named of these three is most often secured, probably because of his orange-yellow color, which renders him more conspicuous in the muddy waters after the spring freshets.

The fish-hawk's manner of securing his prey is highly spectacular. If hunting over a pond he drifts along the lee shore a hundred feet or so above the surface of the water, facing into the wind and keeping his eyes fixed on the pond below. When a fish is sighted, the bird checks himself directly above the quarry on wings that beat horizontally, and should the prospects be good—if the fish is of proper size and at a suitable distance from the surface of the water—down goes the bird at reckless speed, with wings folded and talons wide open. There is a great splash as the hawk strikes the water and seizes the fish by the back.

Year after year I longed to get an osprey at his fishing game on a photographic plate; but who could tell where a hawk might plunge, and how could one be close enough with a camera to catch the bird at it? The matter was given much thought. It was at first planned to capture live goldfish and tether them out as *bait*, but the probable difficulty of securing them when wanted and of making them "stay put" was too great.

So I went to my friend, Dwight Franklin, expert modeler in the American Museum of Natural History, and induced him to make for me an artificial goldfish, to measure 10 or 12 inches in length. This

decoy was carved of wood, equipped with glass eyes and celluloid fins, and was given a coat of yellow paint above and silver beneath. When anchored six inches below the surface of the water a short distance offshore, the keenest-eyed fish-hawk could hardly avoid being misled.

The day chosen for the trial was fortunately a bright one, making possible exposures of exceeding rapidity. The wind was in the southwest, so the west or leeward shore of the pond was selected and the umbrella blind put up at the water's edge. With the aid of boots, my companion and helper was able to place the decoy 10 feet offshore, a distance which for several reasons was deemed suitable. The fish was held below the surface by an 18-ounce rock (the decoy weighing nine), which was tied by a thread to a couple of screws in the belly of the fish.

Another thread was attached to a peg in the snout and run to the inside of the blind, the object being to lend a lifelike appearance to the dummy by pulling the thread and moving the fish about at its moorings when the hawk arrived overhead.

All was now in perfect readiness except that not a hawk was anywhere to be seen! We deemed it best, however, to do our waiting out of sight, and accordingly I entered my blind and my companion hid himself away in an old pig-pen a short way up the shore. Inasmuch as a wider view could be had through a crack in the wall of the pig's shelter than from the peep-hole in the blind, my accomplice agreed to give a signal the moment a hawk was sighted in the distance.

For nearly an hour things were dull — the passing of a kingfisher, with his loud, sput-

Photo by Howard H. Cleaves

ROYAL TERNS: VESSEL REEF, S. C.

Crowded as closely together as humans in the tenement district of New York, these sea birds carry on their incubating and brooding activities. The bird in the foreground is giving her baby a minnow

Photo by Howard H. Cleaves

THE EXCITEMENT OF TOUCHING THE ECCENTRIC WOODCOCK ON THE BACK (SEE PAGE 29)

tering call, the cheery tune of a song-sparrow close by, and the sparkle of the sun on the ruffled surface of the pond being the only things to hold our interest.

THE OSPREY APPEARS

Presently there came a low whistle from the pig-pen, and putting my eye to the observation window I could see a hawk sailing toward the pond from the direction of the Atlantic highlands. Soon he was searching the western border of the pond to the south, all the time working in our direction, arriving almost overhead in a very few minutes. Now was the time to act! The thread leading to the fish's snout was given two or three pulls and the camera pushed into place.

But even before I could get my hand to the shutter release there appeared a shadow over the water, and then there was a splash. The hawk was grappling with the decoy and in a few seconds had raised fish and anchor above the water and was making off with them. I feared for my precious decoy, but at that moment the hawk's talons slipped and his burden (equaling half his own weight)

Photo by Howard H. Cleaves

WOODCOCK'S EGGS UNCOVERED

dropped back into the pond (see illustration).

The osprey, however, was not to be deprived of his breakfast so easily; he was hungry and had met with but poor luck in fishing activities the whole morning. So, instead of going away, he simply circled out over the pond and came up wind looking for the fish again; and the fish, quite unlike any that the hawk had ever met, was there awaiting him.

Seven times the osprey fastened his mighty talons onto the back of the stubborn victim, and toward the last became so exhausted that he lay on the surface of the water for a time with wings outspread, while his claws remained closed on the fish below. The hawk's final act was to drag the fish into shallow water near the shore and stand beside it while he leaned over from time to time and tried to bite into the head of the dummy as it floated on its side.

How long he would have remained standing there cannot be known, for he was frightened away by the noise of the focal-plane shutter in the blind, eight feet away. The bird had not noticed this sound when the previous exposures were made, for he himself had caused so much commotion thrashing about in the water that all minor noises were quite lost.

Although experiences such as the one just described are unusual and not often enjoyed, even by those who follow the birds closely, yet there are many out-of-the-ordinary experiments which one may devise; but, on the other hand, much lasting joy is to be derived from doing and seeing just the "ordinary" things.

THE KILDEER

Who, for example, can recall with anything but pleasure the thrill of finding his first woodcock's nest and the excitement of touching the eccentric bird on the back before she would leave her eggs? And the killdeer! How lasting an impression these vociferous and highly patterned plovers make on a person's mind!

Several years ago a pair decided to stop and nest in a cultivated field near the pasture pond, and it was the best possible fun to watch and photograph them. The spot selected for the nest was in the center of a potato field, and it seemed certain that the eggs would be destroyed when the plants were next cultivated (see page 17).

And yet, were I to disclose the whereabouts of the nest, how could I be sure that human hands would not prove as destructive as horses' feet. The head gardener of the estates where the killdeers lived was a diminutive, tanned individual — a man accustomed to being

Photos by Howard H. Cleaves

SCENE OF THE OSPREY EXPERIMENT

Umbrella blind on shore and Leland Wincapaw, the author's companion, re-anchoring the decoy after it had been dragged ashore by the hawk

much in the open, and who ought, therefore, to be familiar with birds; but whether he was keen on their protection or not, who could tell?

I approached him, however; told him of the nest and pointed it out to him. He had never seen anything like it and was much impressed. Would he cultivate around it? Indeed, yes; in fact, the whole row of potatoes where the nest was located should not be touched till the young plovers were safely gone; and, to make certain that the site could be easily told, a couple of large stones were placed a few feet at either side of the nest.

It was delightful to discover this spirit hidden away beneath the bronzed exterior of the old gardener. He talked of the birds of his native lakes in Switzerland and remarked how the killdeers reminded him of a bird he had seen at home. And each year since our first meeting the gardener has greeted me warmly and told me how long the "ringlets" had been back, for the killdeers have come each spring to the big gardens and reared their four young under the protecting care of the little tanned man and his helpers.

SHOOTING WITH THE LENS

One of the great beauties of bird study and photography is that the subjects are without limit. Should one exhaust the possibilities near home (which is well nigh impossible) or desire to expand his circle of feathered acquaintances, there are always awaiting him the wonderful colonies both inland and on the coast. Or if one is not set on having the spectacular, he may go to the north woods, where the brilliant and shy warblers and other birds of passage make their homes.

But at some time, be it soon or late, one is almost dead certain to come under the spell of the sea-bird. There is something overpowering and enthralling about standing beneath screaming, gyrating myriads of sea-swallows and watching them settle on their nests as lightly as giant snowflakes. And then there are the gulls, petrels, guillemots, puffins, etc., of the islands along the north Atlantic coast, while on the sun-baked dunes and

Photos by Howard H. Cleaves

THE FISH WING-STROKE, AFTER THE HAWK'S TALONS BECAME FASTENED TO THE BACK OF THE DECOY AND THE BIRD WAS STRUGGLING TO RISE WITH HIS BURDEN

marshes of the southern seaboard are the herons, skimmers, oyster-catchers, the giant royal terns, and countless others—all possessing their individualities and making their separate impressions.

A person should not content himself with being told about these bird cities. They are as marvelous in their way as the wonders of the Yellowstone region, and many of them are under the protection and care of the Federal government as are the animals of the National Park. These birds are, therefore, recognized as a part of the nation's resources, and are available for inspection to any well-intentioned citizen on application. There are at this moment 64 of these wild-life reservations throughout the United States and possessions.

SIXTY-FOUR BIRD RESERVATIONS IN THE UNITED STATES AND TERRITORIES

The names and locations of the bird reservations are as follows:

1. Pelican Island, Fla.
2. Breton Island, La.
3. Stump Lake, N. Dak.
4. Huron Islands, Mich.
5. Siskiwit Islands, Mich.
6. Passage Key, Fla.
7. Indian Key, Fla.

OSPREY, OR FISH-HAWK, RISING FROM A STRIKE Photo and copyright, 1914, by Howard H. Cleaves

"At that moment the hawk's talons slipped and his burden (equaling half his own weight) dropped back into the pond"

Photo by Howard H. Cleaves

"How long he would have remained standing there cannot be known, for he was frightened away by the noise of the focal-plane shutter in the blind, eight feet away. The bird had not noticed this sound when the previous exposures were made, for he himself had caused so much commotion thrashing about in the water that all minor noises were quite lost" (see text, page 29).

8. Tern Islands, La.
9. Shell Keys, La.
10. Three Arch Rocks, Ore.
11. Flattery Rocks, Wash.
12. Quillayute Needles, Wash.
13. Copalis Rock, Wash.
14. East Timbalier, La.
15. Mosquito Inlet, Fla.
16. Tortugas Keys, Fla.
17. Key West, Fla.
18. Klamath Lake, Ore.
19. Lake Malheur, Ore.
20. Chase Lake, N. Dak.
21. Pine Island, Fla.
22. Palma Sola, Fla.
23. Matlacha Pass, Fla.
24. Island Bay, Fla.
25. Loch-Katrine, Wyo.
26. Hawaiian Islands, Hawaii
27. Salt River, Ariz.
28. East Park, Cal.
29. Deer Flat, Idaho

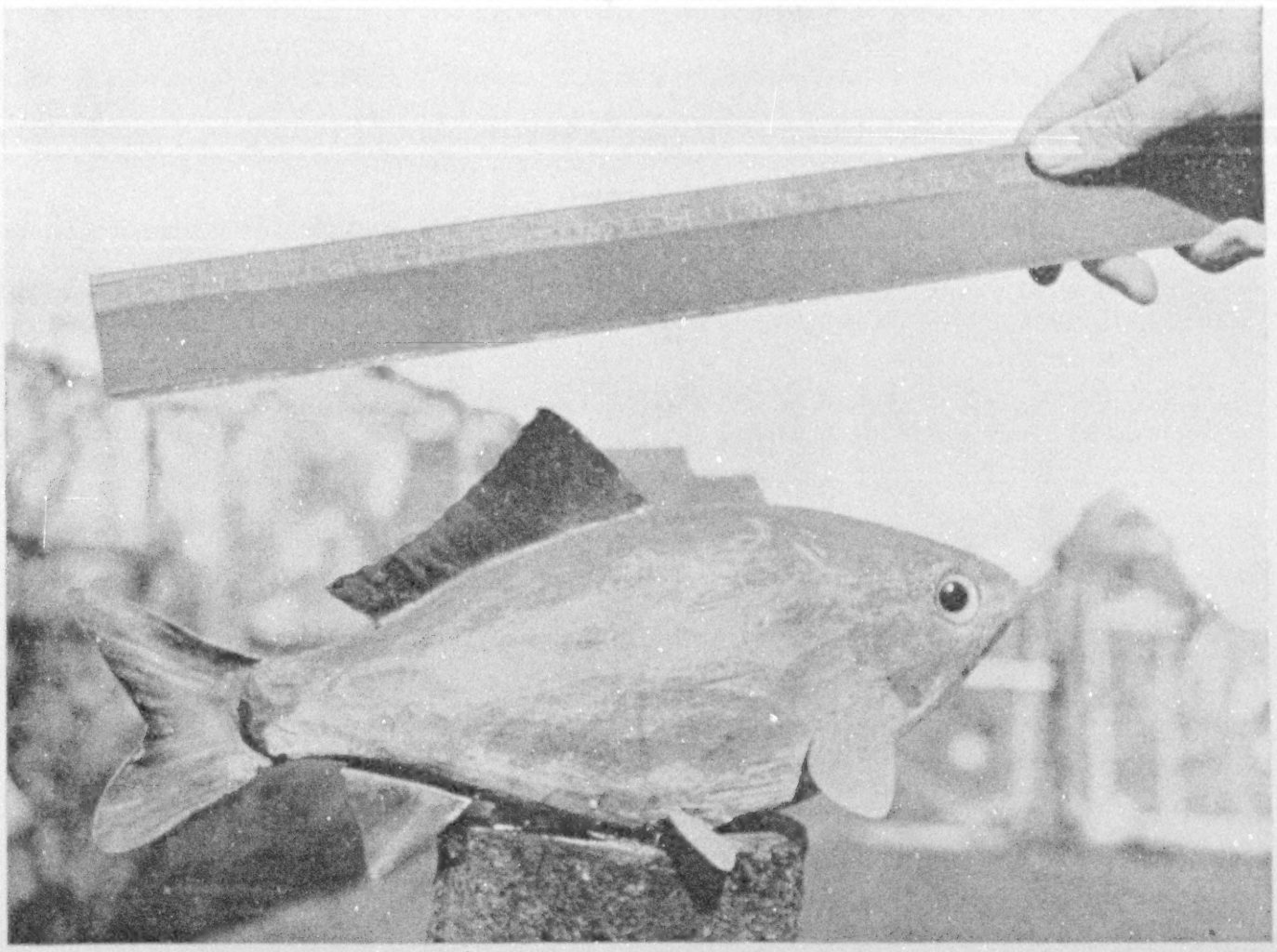


Photo by Howard H. Cleaves

SHOWING THE GOLDFISH WITH "FULL RIG" OF FINS BEFORE BEING ANCHORED OUT FOR THE EXPERIMENT

30. Willow Creek, Mont.
31. Carlsbad, N. Mex.
32. Rio Grande, N. Mex.
33. Cold Springs, Ore.
34. Belle Fourche, S. Dak.
35. Strawberry Valley, Utah.
36. Keechelus, Wash.
37. Kachess, Wash.
38. Clealum, Wash.
39. Bumping Lake, Wash.
40. Conconully, Wash.
41. Pathfinder, Wyo.
42. Shoshone, Wyo.
43. Minidoka, Idaho.
44. Bering Sea, Alaska.
45. Tuxedni, Alaska.
46. St. Lazaria, Alaska.
47. Yukon Delta, Alaska.
48. Culebra, P. R.
49. Farallon, Cal.
50. Pribilof, Alaska.*
51. Bogoslof, Alaska.
52. Clear Lake, Cal.
53. Forester Island, Alaska.
54. Hazy Islands, Alaska.
55. Niobrara, Nebr.
56. Green Bay, Wis.
57. Chamisso Island, Alaska.
58. Pishkun, Montana.

* Transferred to Bureau of Fisheries by act of April 21, 1910.

59. Desecheo Island, P. R.
60. Gravel Island, Wis. (Lake Michigan).
61. Aleutian Islands, Alaska.
62. Walker Lake, Ark.
63. Petit Bois Island, Ala.
64. Anaho Island, Nev.

What could constitute a more ideal vacation trip than packing off in May or June, the height of the birds' breeding period, and traversing a portion of the coast with a view to stopping here and there at the most populous and fascinating bird rookeries? If the writer were to be stricken in the next 24 hours with some malady which would confine him to his bed for the balance of his days, the most highly cherished memories that could come to him would be of his experiences in the big bird colonies of the Atlantic coast. Most of these spots are islands, for there are few enemies on these places such as the land birds have to contend with, and an abundant and constant food supply is always at hand in the ocean near by.

From personal, first-hand experience

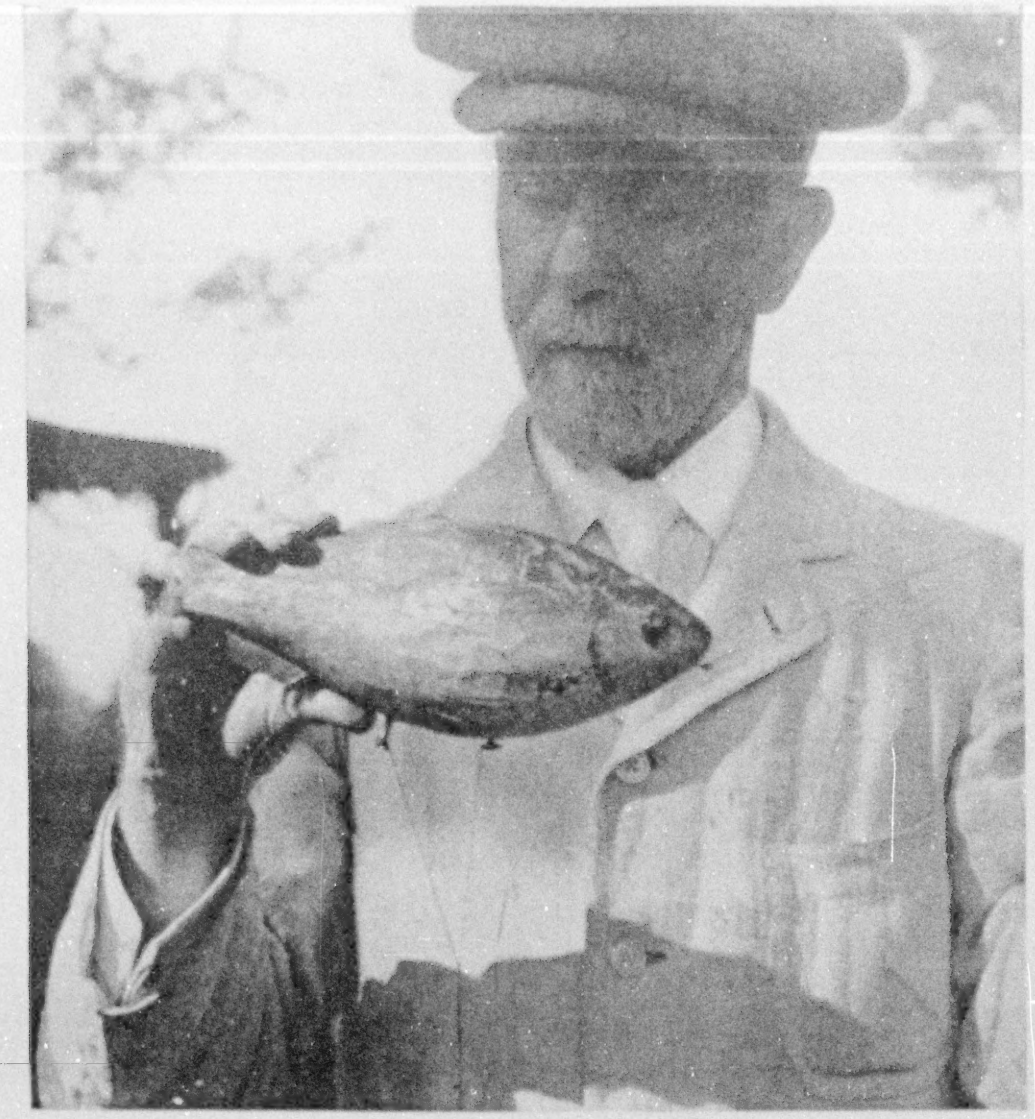


Photo by Howard H. Cleaves

THE DECOY GOLDFISH AFTER THE EXPERIMENT

Showing how fins were all torn away by hawk's talons, and scratches and scars on the back of the fish. The anchor stone, thread, and nose-string are also to be seen

the writer can recommend the following specific localities and general regions:

Seal Island, Nova Scotia, for the herring gull, black guillemot, Leach's petrel, eider duck, Bicknell's thrush, blackpoll warbler, and yellow-billed flycatcher.

Lake George, Nova Scotia, for the great black-backed or minister gull.

Muskeget Isle and Martha's Vineyard, Massachusetts, for the Wilson's or common tern, least tern, piping-plover, black duck, and laughing gull.

Gardiner's Island, New York, for the fish-hawk, black-crowned night heron, common and roseate terns, piping-plover, short-eared owl, parula warbler, and Bartramian sandpiper.

Cobbs, Wreck, and Little Isaacs islands, Cape Charles, Virginia, for the black skimmer, or flood gull, laughing gull, clapper rail, and common tern.

And the coast of South Carolina for a distance of 60 or 70 miles north of Charleston for the willet, Wilson's plover, oyster-catcher, royal tern, least tern, snowy and American egrets, Louisiana, little blue, black-crowned night, and little green herons, brown pelican, black skimmer, anhinga, or snakebird, etc., and many, many land birds, including the incomparable painted bunting.

To even begin going into a detailed description of the home life of one of these wonderful creatures would require more space than could be allowed in a general magazine article. The writer can therefore but urge the reader to spurn the summer hotel, with its pomp and artificiality, charter for himself a modest sloop or power-boat, and make his way through lagoons and tide-rips to these isolated islands, and follow the picturesque channels of the salt marsh in quest of the bird-inhabited bars and reefs.

YOUNG JAPAN

By Eliza R. Scidmore

THE children of the streets and the children who play in the homes and gardens of the rich are equally the joy of the Empire, the delight of the stranger in Japan, and the distraction of the amateur photographer. All of them seem happy save the unhappy mites doomed to ugly, clumsy European dresses and shoes and hats by their over-ambitious parents. In their own dresses of rainbow crape or blue cotton, they are the drollest, quaintest little images of their grandfathers, and the funny little caps and bibs of the babies make them strange travesties of solemn temple images.

Five hundred thousand little Japanese arrive each year, according to the census records, and all these small additions to the populace for 10 years back seem always to be on view in the streets.

Despite the fable that Japanese babies never cry, they often do lift their voices in pain or wrath; but they seem to have less cause for crying than the babies of the Western World, where so much theorizing has been done about them and great conventions of mothers discuss their needs. Babies are petted and played with here almost more than with us, and no learned young mothers ever lay their babies away in dark rooms alone to sleep.

The little one of the people is never left behind when the mother or the family go abroad. It sleeps and wakes as it rides around on mother's or elder sister's warm back; or, in colder weather, enfolded in the one great matted coat that converts the bearer into an astonishing humpback. It goes to the markets, the shops, and the temples, and holds its place securely while the mother draws water, sweeps, or washes, and then participates in games of marbles or hop scotch and turns pin-wheels and somersaults with elder brother.

The boy or girl big enough to carry a baby on its back usually has one bound there. Several millions of the abundant population are to be classed as the "two-storied," and yet the streets seem crowded with children. Sometimes the fat, lob-lolly baby seems too nearly the same size as the small brother or sister carrying it, and once I saw a man, trying to comfort one of these weeping little mothers, mount the two on his back, and the three-story group walked away on two feet.

Schools begin early in the morning in Japan, as in Switzerland, and as schoolhouses are well-windowed, draughty and costly to heat, children have their longest vacations in midwinter. In every city one is struck by the numbers of boys in military caps and girls in red *hakamas* (divided skirts, a school uniform) trudging the streets in the early morning and afternoon, and it impresses one as evidence of great thirst for knowledge or the thorough administration of the law for compulsory education. At recess time one easily finds the school playground by the shouts of the square acre of frolicking children, and from the streets and country roads one sees lines of children doing drills or calisthenics.

In the kindergartens boys and girls drill and play much alike, but after that diverting period the small boy blooms into knickerbockers and a peaked cap, and carries his books in a knapsack on his back. Gymnastic drills become military drills, and at the higher middle school, which is preparatory to the university, the boys get training in jiu-jutsu and in fencing with bamboo swords.

In some schools—notably the Peeress School and others in Tokyo—the girls are also taught the *naganata*, or fencing with bamboo spears; and they, too, can march and perform evolutions like little soldiers, and render first-aid services according to Red Cross rules.

As a people, the Japanese are great walkers, and their sensible foot-gear contributes to the enjoyment of such exercise. Flatfoot, the great and universal American disease, is unknown in Japan, and army surgeons laugh when asked for their records of fallen arches. As their ancestors walked in the train of the daimios up to Yeddo and back again every

year, or made pilgrimage to far temples or famous landscapes, little Japan trudges sturdily about the environs of his city in military formation, or makes railway and walking trips farther afield every Saturday in spring and autumn.

One hears the chirp of their voices or some chanted poem as they march through the streets, even before daylight, on these red-letter days. This year all central Japan made pilgrimage to Momoyama, to the tomb of the Meiji Superior, and every day in the week an average of 30,000 school children came by train and joined the decorous crowds that filled the roadways from side to side as they walked up through the bamboo forest to the great, green grave mound on the summit of the hill. On many days 150,000 people visited Momoyama, but the spirit of reverence was so great that there was no noise, no frolicking and shouting, or running at play of all these youngsters.

Most touching of all demonstrations of affection made by his people while the Meiji Emperor lay dying was that presence of legions of school children, who, singly or in groups, bowed low toward the palace walls or prostrated themselves on the gravel to pray that the august life might be spared.

Wherever the great Emperor had traveled in the land, the school children were always lined up at railway stations to do him honor. The Spartan training and the iron etiquette of Japanese children enable them to stand like statues—or soldiers—in storm or rain, a summer shower affecting these people in their humid climate no more than it does the birds.

Once the Meiji Emperor saw ranks of children standing in the open in swirling snow, and court and local officials never forgot his wrath. "Let this never happen to my children again," said the compassionate ruler; hence every school boy and girl who goes on such errand now, and all who went to Momoyama, had an umbrella strapped to the back with the lunch basket.

While Japanese children may be martinets in good manners when parents and teachers are around, they have as much fun as any other children by themselves. The impishness of street children is even gentle compared to our street arabs, but baseball and football may teach new standards even to the highest classes. They have their games of tag and follow-my-leader, of blindman's buff, games of cards and checkers, hide and seek, and many mystic rhymes for "counting out." In their indoor games a common forfeit is a dab on the face with the ink brush, and a company of noble youngsters are as so many minstrels or coal heavers when they have played long at "twenty-questions" and its kind.

In winter they build snow men as they build sand forts on the seashore, and at the regular spring and fall house-cleaning they wreak their will with the white paper of the *shojis*, or sliding screens, that wall a room from the outer veranda of the house. They love to tear and daub and prod the papers they at all other times treat so respectfully. There are street jugglers and acrobats, dancers and singers, that would set our small folk wild were they called in to help enliven a children's party—little gnomes who dance in masks as tall as themselves, old men with india-rubber faces, who twist mouths and noses and make faces that small boys only too rapturously copy.

Little Japan drinks tea with as much gusto and as naturally as his elders, and the smallest children manage their chop-sticks with a deftness that amazes the blundering stranger, who can make no headway with the magic wands. Children learn to use the chop-sticks and acquire their table manners more easily than western children learn the complicated drill with knife and fork and spoon. The implements are simpler and lighter, and all Japanese food is more completely prepared before being sent to the table. All bones and waste are eliminated in the kitchen, and meat and such solid materials are cut into manageable shreds and morsels before cooking.

Young girls have a rigorous training in household arts and such accomplishments as flower arrangement, ceremonial tea-making, the construction of miniature landscapes in shallow trays or boxes, and playing the koto and the foreign piano. Yet it was the mistress of the most important girls' school who put all the foreign pianos out and dismissed the teacher

"for the sake of peace and harmony in the school."

Three years of training and practice are not enough to perfect the ordinary pupil in that exquisitely elaborate and refined Japanese art of flower arrangement, where flowers spring, with their leaves and stems, from vases or basins of shallow water as they grow naturally, but Nature perfected and idealized according to codes of rules made by teachers of such esthetic arts for the past eight and ten centuries.

Also the gardens, in which these girls gather for decorous play and games of poetry, are as carefully arranged idealizations of natural scenery, and the soft colors of their crape and silk kimonos accord perfectly with the unvarying garden symphony of gray rocks and evergreen foliage. A soft, grass sandal, especially made for garden wear, protects the precious garden stones and the deep-pile mats of fine, soft grass.

The indoor ceremonies of receiving, entertaining, and speeding a guest are matters of careful training, for nothing in Japanese life lacks its conventional rules, its elaborate etiquette. The graceful dress of Japanese women, its sober tones and long lines, is suited to the dainty house interiors, with their fine, satiny straw mats and luxurious crape cushions. The craze for European dress for women, following upon its adoption as the dress of court ceremony 25 years ago, fortunately died out in due time; so that, except at the palace and on most ceremonial occasions where foreigners take part, Japanese women of highest rank wear their own becoming clothes—a rebuke in its unchanging lines and quiet colors to the insane vagaries of the West.

Each season has its appropriate material and colors. Each year the fashions change in ways the purblind foreigner does not see. Each year the theme of the Emperor's New Year poem gives suggestion to designers and dyers, and in this way these varying patterns of sashes and neck folds date them precisely to the initiated.

Great patterns and gay colors are for children and babies, and from the beginning of time the Japanese woman has folded her robe over to the right that she might hold the edge in place when she bent in a deep bow.

Only in death is the kimono folded to the left, so that there is always laughter when the self-complacent foreigner has her portrait taken or goes to a fancy-dress ball, or a theater manager clothes a whole company in kimonos folded according to the etiquette of corpses. Nothing else in the world is so funny—not the most luckless attempt of the Japanese woman to wear foreign dress—as the failures and burlesque the foreign woman achieves when she essays Japanese dress. The East has its revenge tenfold at those seasons, and photographers' rooms in Japanese cities are chambers of such horrors.

EXPLORERS OF A NEW KIND

Successful Introduction of Beetles and Parasites to Check Ravages of the Gipsy-moth and Brown-tail Moth

By L. O. Howard

Chief of the Bureau of Entomology, U. S. Department of Agriculture

THE story of the gipsy-moth and that of the brown-tail moth are two of those geographic happenings unconsidered in the old geography, but important in the geography of today. They are not normal inhabitants of the United States, but are assisted immigrants. The gipsy-moth (see page 50) was brought to this country by a French professor of astronomy in a New England university in the course of some experimental work which he was doing.

Photo from U. S. Department of Agriculture

SPRAYING WITH A SOLUTION OF ARSENATE OF LEAD TO KILL GIPSY-MOTH CATERPILLARS NEAR BOSTON

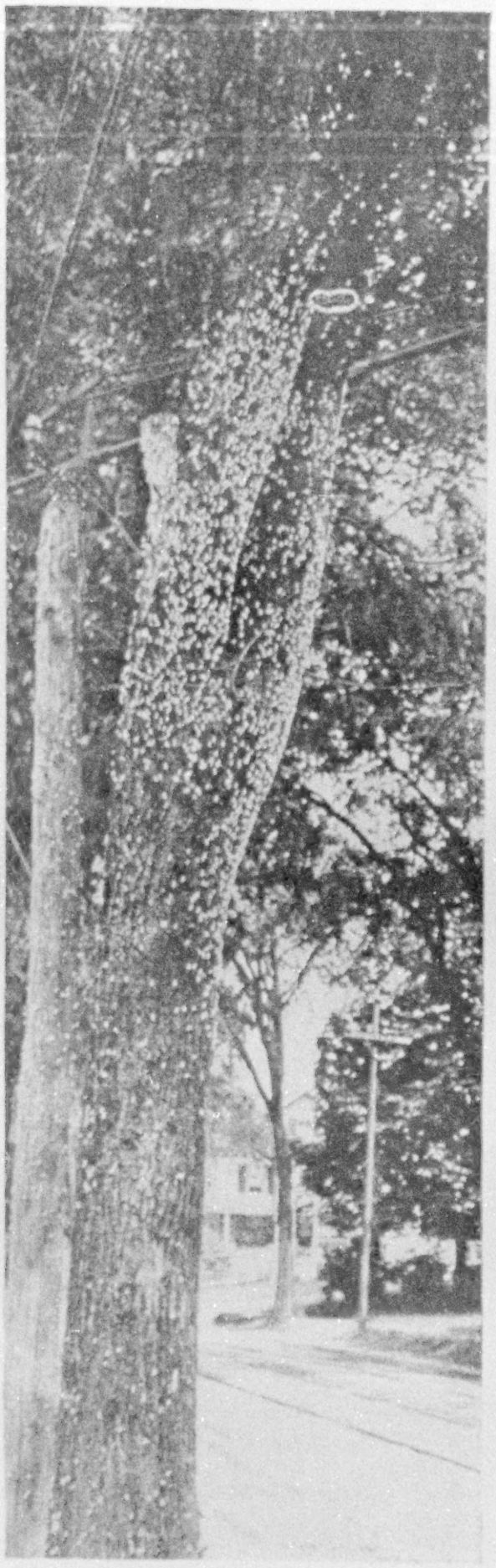


Photo from U. S. Department of Agriculture

BROWN-TAIL MOTHS ON A TREE

That sort of importation of insect pests is fortunately rare, and this is almost the only case of the kind on record.

The brown-tail moth (see page 52), on the contrary, came to America in the normal course of commerce. Its winter nests were brought here attached to some rose-bushes which were imported by a Massachusetts florist from Holland, and, unrecognized, the caterpillars issued the following spring and the species soon became established in America.

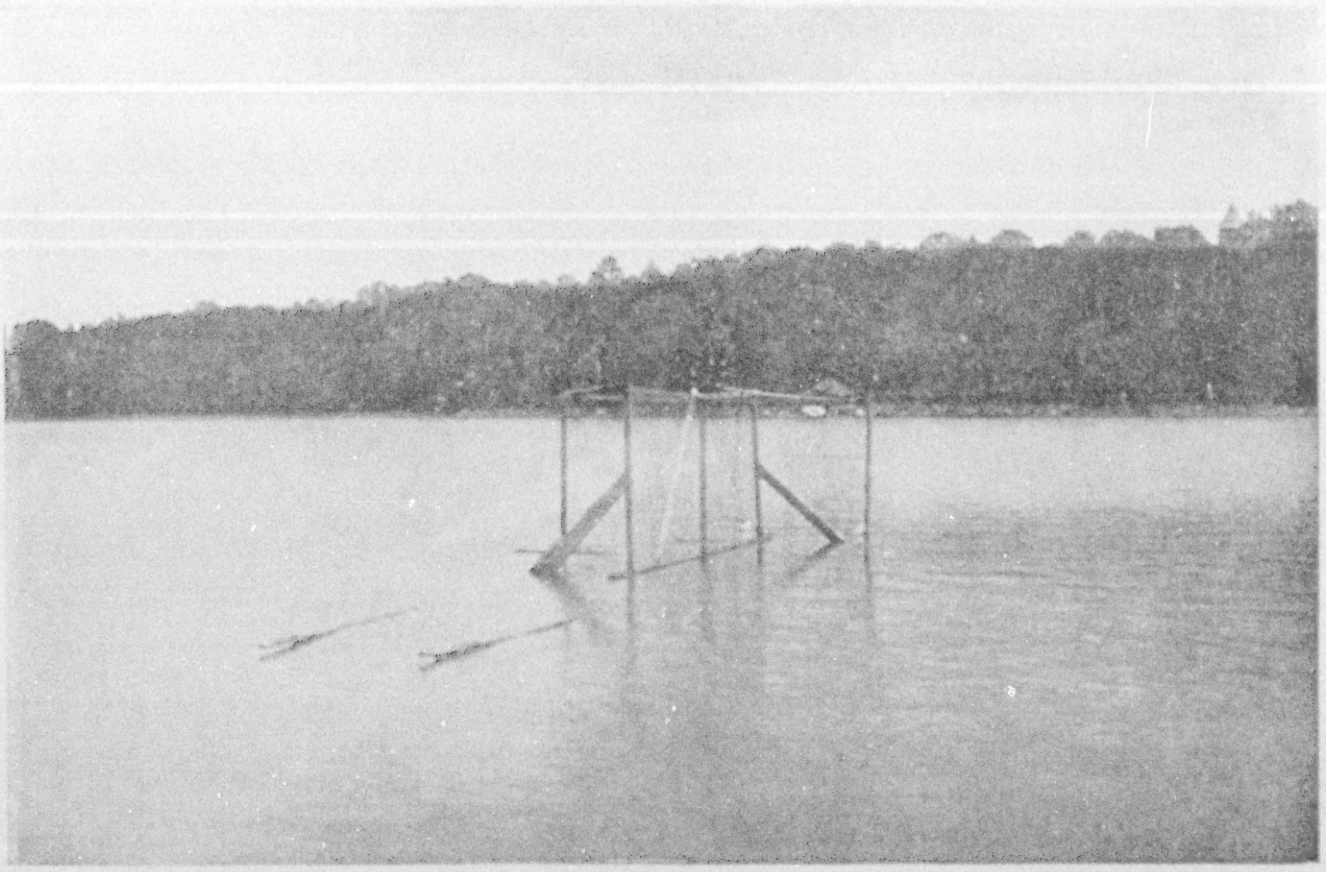
The gipsy-moth was brought over in 1868 and remained unrecognized until 1889. The brown-tail was brought here in 1891 and was first recognized in 1894.

From 1892 until 1900, both species being confined to the extreme eastern portion of the State of Massachusetts, a fight for extermination was waged against them by the authorities of that State. Unfortunately, certain influences at work caused the stopping of the appropriations in 1900, and from that time until 1905 both insects spread uninterruptedly save for private work on the part of individual property-holders. In 1905 Massachusetts began again to appropriate large sums for the purpose of trying once more to exterminate the pests, and later, as the spread continued, New Hampshire, Maine, Rhode Island, Connecticut began to spend money in the same direction. Then the United States government stepped in, and in an effort not to exterminate the insects, but to prevent their further spread over the face of the country, large sums have been spent annually in the attempt at least to restrict them.

IMPORTING MOTH PARASITES

In 1905 was begun for the first time the attempt to import from Europe and from Japan the parasites and other natural insect enemies of the gipsy-moth, and in the course of this attempt extensive travels have been made by agents of the Department of Agriculture, the services of foreign naturalists have been called in, and enormous numbers of parasites have been brought from all over central and southern Europe and from Japan and have been colonized in the infested region.

The introduction of the pests and their spread furnishes the first geographic feature. The search for their parasites the second, and the third has been the quarantine by the newly constituted Federal Horticultural Board of the United States



THE YOUNG CATERPILLARS ARE CARRIED BY THE WIND SIX MILES OR MORE

The screen shown in this picture is covered with tanglefoot to catch caterpillars in the air. As the young caterpillar of the gipsy-moth hatches from the egg it spins down on warm days suspended by a silken thread, is caught up by the wind and carried sometimes for miles before it succeeds in attaching itself to a tree or shrub. Large-scale experiments in the last two or three years, conducted by erecting enormous wire screens at various distances to the windward from infested woods, the screens being coated with a sticky substance, have shown that many young caterpillars are carried in this way to a distance of six miles or more.

Photos from U. S. Department of Agriculture

SAWED LUMBER, BEARING EGG-MASSES OF THE GIPSY-MOTH, SERVES AS AN EASY MEANS FOR THE SPREAD OF THE MOTHS

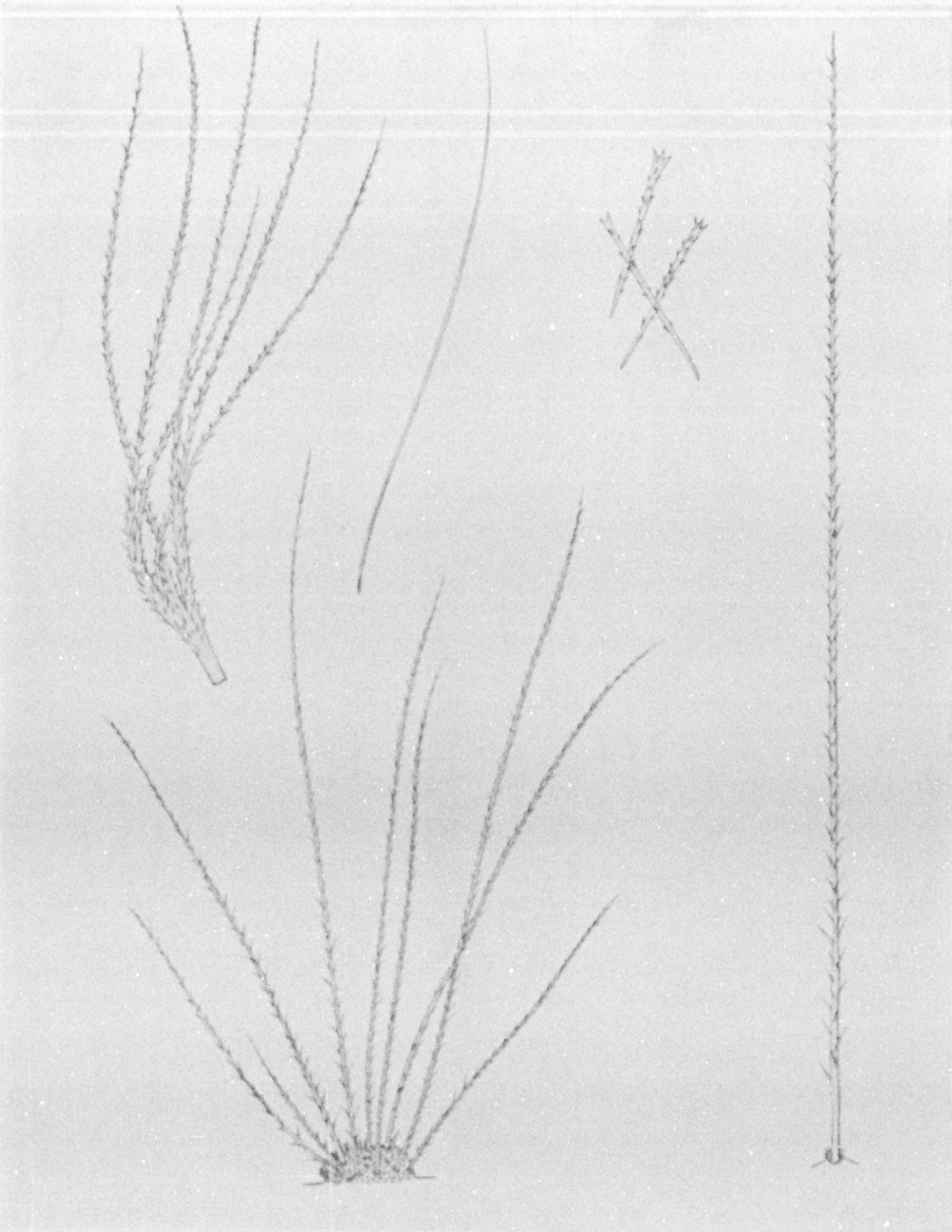


Photo from U. S. Department of Agriculture

THE GREATLY ENLARGED BARBED HAIRS OF A BROWN-TAIL MOTH CATERPILLAR, WHICH CAUSE THE BROWN-TAIL RASH (SEE TEXT, PAGE 48)

of the infested areas in New England from the rest of the United States, and all of Europe and Japan from the United States, in so far as non-inspected nursery stock, shrubs, ornamental trees, and any substances likely to carry the eggs of the gipsy-moth or the nests of the brown-tail moth are concerned.

It is safe to say first that the work which has been done since 1905 has greatly restricted the spread of both species, and especially that of the gipsy-moth. It is safe to say further that the living conditions in the infested territory have been greatly improved.

Neither gipsy-moth nor brown-tail moth are longer to be feared as shade-tree enemies or as enemies of orchards or gardens. Both have become relegated to the class of forest insects, so far as

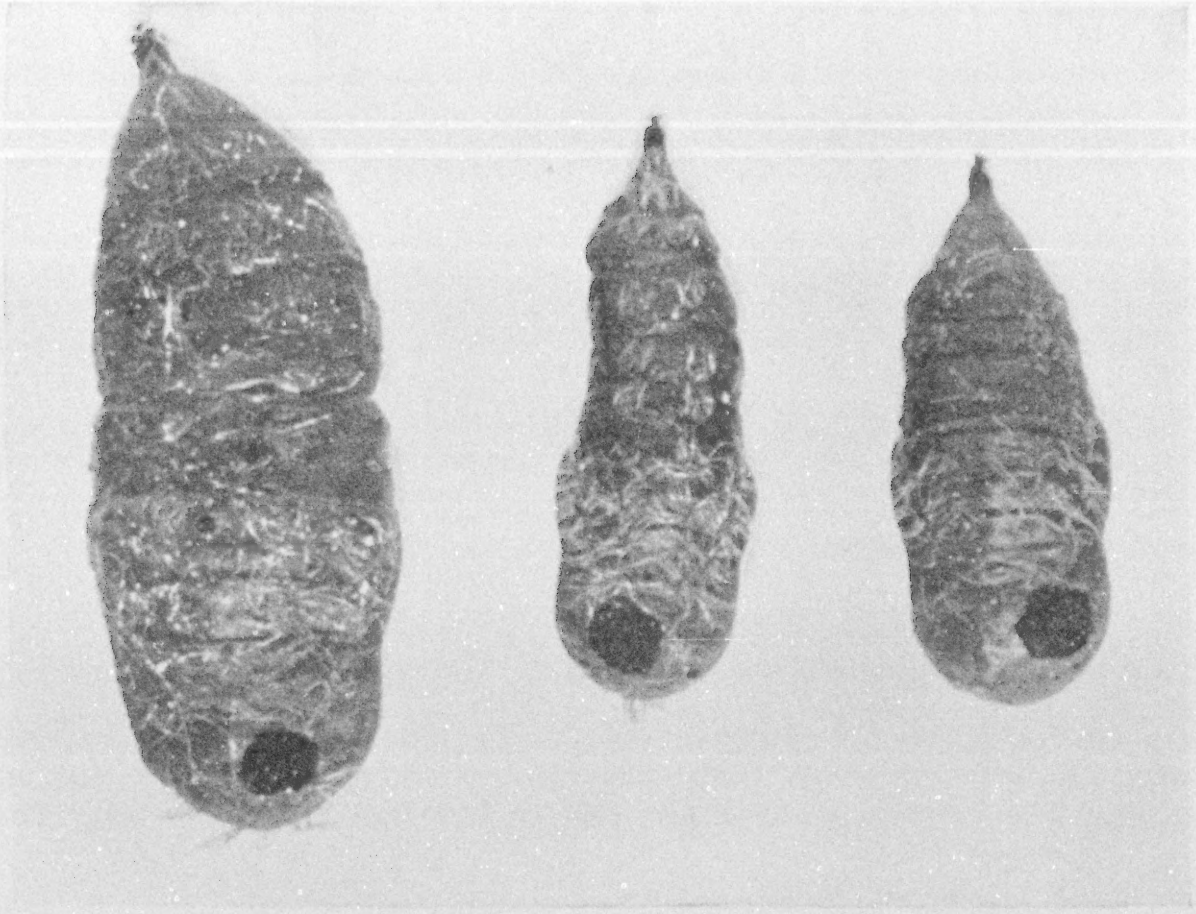


Photo from U. S. Department of Agriculture

CHRYSALIDS OF GIPSY-MOTHS WHICH HAVE BEEN DESTROYED BY PARASITES, PROBABLY *Calosoma sycophanta* (SEE PAGE 53 AND TEXT, PAGE 66)

their ravages are concerned, with the additional damage which the brown-tail moth does to summer resorts by virtue of the irritating rash produced on the skin of persons in its neighborhood by the hairs from the caterpillars.

FIGHTING LOCAL OUTBREAKS

But there has been some spread. The area now occupied by the brown-tail moth has been enlarged enormously toward the north and the east. The gipsy-moth has spread much more slowly, but still rather steadily, in practically all directions, though more to the north and east.

Four sporadic outbreaks of the gipsy-moth have been found outside of the regularly infested territory — two in Connecticut, one at Geneva, N. Y., and the fourth (only discovered in January, 1914) in the vicinity of Cleveland, Ohio. The New York outbreak has been stamped out; the Cleveland outbreak will probably be stamped out this year; those in Connecticut are thoroughly under control, will not be permitted to spread, and with some certainty will be annihilated.

We have referred to the conditions within the infested region as having improved. This has been due to actual exterminative work in the destruction of the egg-clusters of the gipsy-moth, in the burning of the winter nests of the brown-tail, in the destruction of the gipsy-moth caterpillars by spraying, by collecting them under burlap bands on tree trunks, where they are subsequently crushed, and by the general cleaning up of roadsides throughout the region.

A number of species of the imported natural enemies (see pages 51 and 53) have accommodated themselves to New England conditions, have increased and spread, and during the past year probably destroyed more than 50 per cent of the gipsy-moths and brown-tail moths which hatched in the central New England region. Moreover, a disease has attacked the gipsy-moth caterpillars, and another those of the brown-tail moth, and these diseases are apparently becoming more widespread and virulent.

STUDYING FEEDING HABITS

The parasites and the diseases are working in the woodlands as well as along

EXPRESS WAGON-LOADS OF EUROPEAN PARASITES OF THE GIPSY-MOTH ARRIVING AT THE LABORATORY AT MELROSE HIGHLANDS, MASS.

Photos from U. S. Department of Agriculture

LIBERATING EUROPEAN PARASITES IN NEW ENGLAND WOODS TO DESTROY GIPSY AND BROWN-TAIL MOTHS

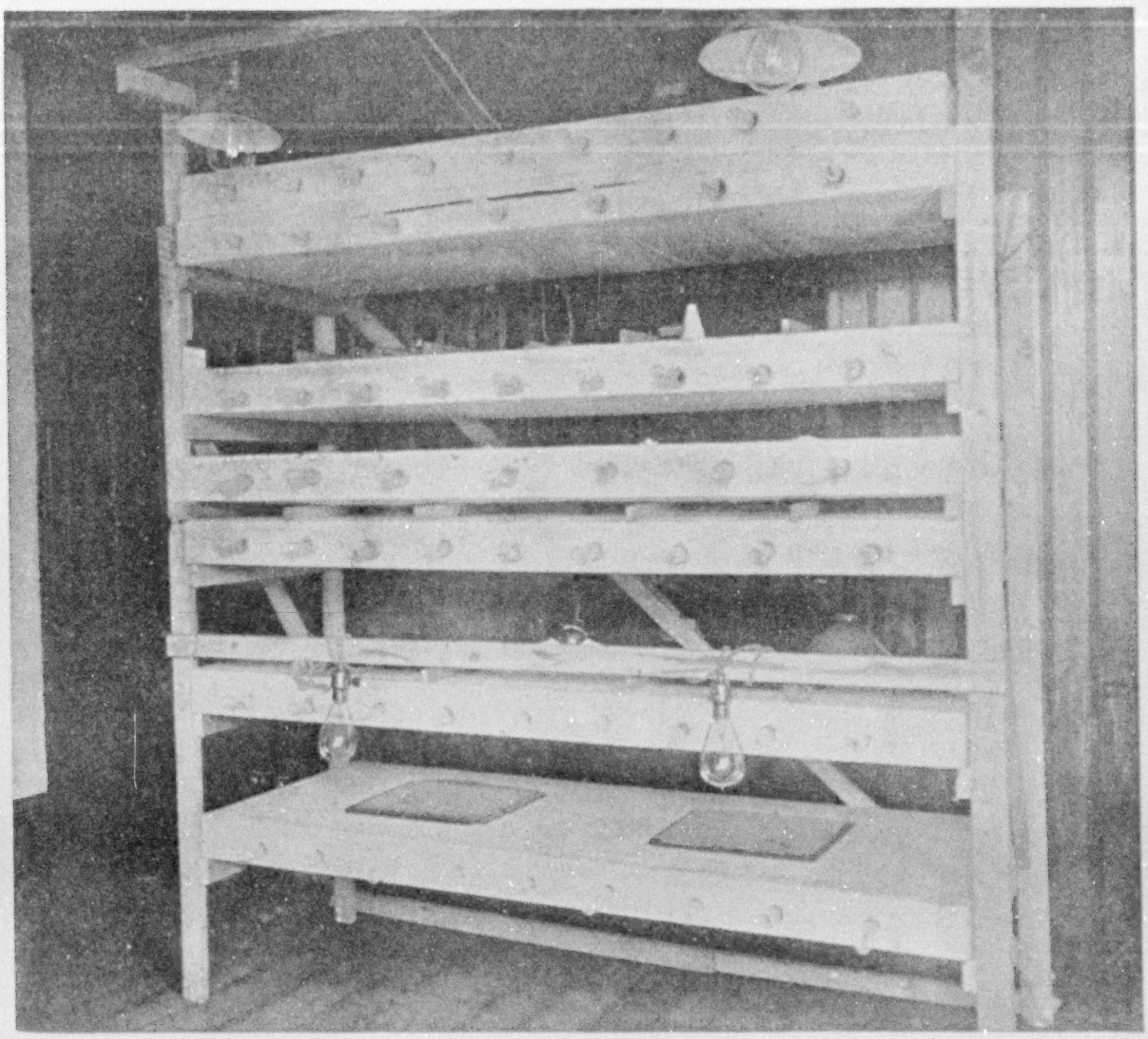


Photo from U. S. Department of Agriculture

TRAYS IN WHICH TINY FLIES, *Schedius* (EGG PARASITES), WERE REARED IN THE LABORATORY AT MELROSE HIGHLANDS, MASS.

Each tray is stocked with 1,000,000 gipsy-moth eggs. About 90,000 parasites were reared in each tray for colonization in the field in 1913 (see also page 66)

the streets and in the gardens and in the orchards, and the forest attack is becoming more and more alleviated by these means. But it is not intended that we should rely upon parasites and diseases alone to protect the forests. Careful studies of the feeding habits of the gipsy-moth in particular have shown that, although when full grown it attacks almost all sorts of living vegetation, when young it can live successfully upon but a few plants. It must grow large and strong before it can eat and assimilate the leaves of most trees. A pure stand of pine or any other conifer, for example, cannot be harmed by the gipsy-moth, and the same may be said of hickory, maple, chestnut, alder, beech, and of mixed forests of these kinds of trees; but where a mixed forest contains oaks and gray birches, then it will suffer, because these two kinds of trees are the preferred food plants of these destructive leaf-eaters.

It results therefore that practical methods of thinning can often be adopted that will almost perfectly protect a mixed forest, and experiments have shown that mixtures of chestnut, ash, red maple, pine, and hickory are practically uninjured by the gipsy-moth. In these cases the oak scrub has been cut out and the larger oaks and gray birch have been removed.

Photo from U. S. Department of Agriculture

INTERIOR OF PARASITE BREEDING SHED WHERE ONE MILLION TINY FLIES WERE REARED IN 1913: MELROSE HIGHLANDS, MASS. (SEE TEXT, PAGE 66)

In woodlands where the oaks predominate, however, the problem is a much more serious one and may mean ultimate reforestation.

In reaching the present rather promising situation, an enormous amount of work has been done. It must be realized that when, after a period of five years, the State of Massachusetts began once more, in 1905, to attempt to check the gipsy-moth, conditions within the infested territory were almost unlivable. The orchards and the shade trees were dying, the parks and the dooryards were stripped of all kinds of foliage in June, the wooded hillsides were brown when they should have been green, and in the villages and towns during the latter part of May and through June caterpillars were crawling everywhere—on the sidewalks, on the sides of houses, and even into houses. Methods of hand destruction were used in all of the infested towns. The new State law provided in general that each town should do its own work and should be recompensed by the State to the extent of one-half or more of the amount expended.

CONGRESS DECIDES TO HELP

When the moth began to spread beyond the boundaries of Massachusetts the Congress of the United States was importuned to make appropriations. By this time it had become evident that extermination was out of the question without the expenditure of enormous sums of money, and appropriations were subsequently made by Congress, not to attempt extermination, but to prevent, if possible, the further spread of both the gipsy-moth and the brown-tail moth.

The female of the gipsy-moth does not fly; its body is too heavy (see page 50);

and it was thought that the species spread only while in the caterpillar stage, by crawling upon trolley cars, upon automobiles and other vehicles, and upon the clothes of pedestrians, and that it was thus carried for the most part along the main traveled highways and thus gained a large spread.

In consequence, for several years the attention of the government workers was focused upon these main traveled roads, and the roadsides were cleaned up to a depth of from 50 to 100 feet, and the trees that were left were banded and sprayed, leaving the roadsides in such condition that there was no possibility of caterpillars falling upon passing vehicles or persons. It is undoubtedly true that by this means a far greater spread than has occurred was prevented.

A MOTH AËROPLANE

More recently, however, it has been discovered that a very important means of spread had been overlooked. As the young caterpillar of the gipsy-moth hatches from the egg it spins down on warm days suspended by a silken thread, is caught up by the wind and carried sometimes for miles before it succeeds in attaching itself to a tree or shrub. Large-scale experiments in the last two or three years, conducted by erecting enormous wire screens (see page 41) at various distances to the windward from infested woods, the screens being coated with a sticky substance, have shown that many young caterpillars are carried in this way to a distance of six miles or more.

This discovery has altered the methods of endeavoring to prevent the further spread of this insect, and as a result the operations are now carried on most intensively along the border of spread, especial attention being given to colonies that occur on hillsides, since young caterpillars from these colonies are more likely to be spread to great distances by the wind.

Another method of preventing the spread of the gipsy-moth is the inspection of products shipped from the infested region. This measure is very important and has been carried on with increasing care year after year. A perfected system has been inaugurated by the comparatively recently established

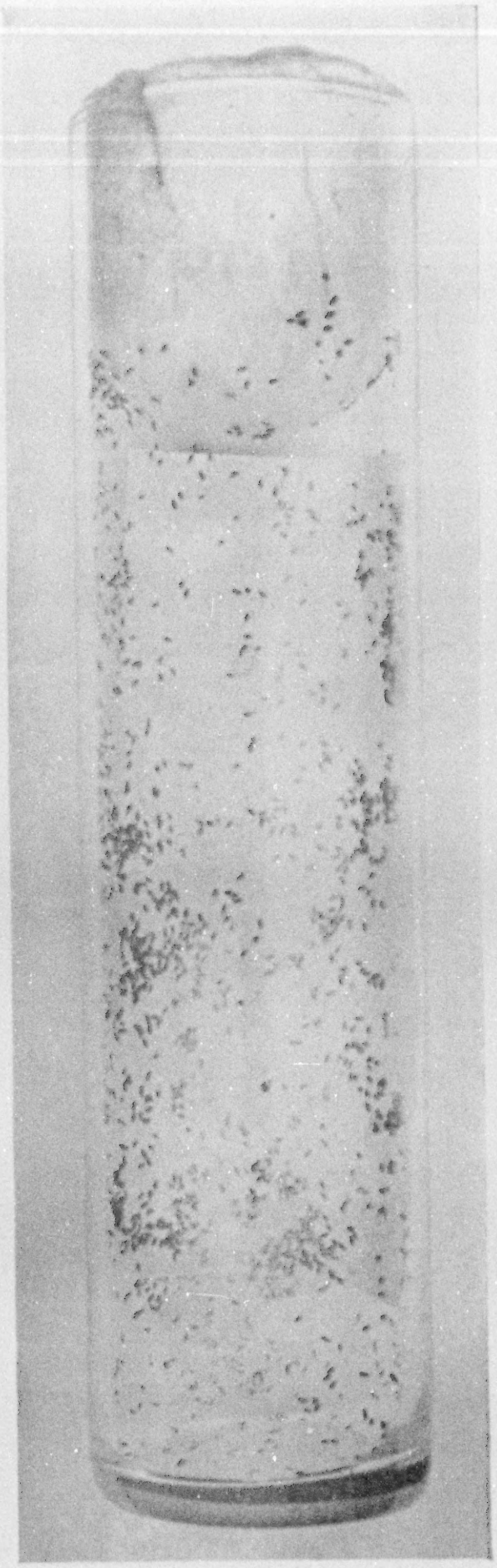


Photo from U. S. Department of Agriculture

THIS TUBE CONTAINS 1,600 TINY FLIES, *Schedius kuvanæ*

The flies, when liberated, will deposit their eggs in the eggs of the gipsy-moth, thus destroying the latter (see page 66).

Federal Horticultural Board, which has provided an absolute quarantine of the rest of the country against the region inhabited by the gipsy-moth and the brown-tail moth.

METHODS OF TRAVEL

This means that no plants from the nurseries of this region, no Christmas trees, and no plant products, such as railroad ties, cord-wood, telephone poles, and no objects of any kind upon which the egg-masses of the gipsy-moth might be laid or upon which the winter nests of the brown-tail moth might occur, can leave the territory without a certificate of inspection which certifies that they are free from these insects.

This, of course, means a great deal of work. The gipsy-moth passes the winter in the egg stage, in clumps of eggs numbering from 300 to 500, and these clumps are attached to all sorts of objects. Take, for example, the pile of boards shown on page 41. These boards are sawn and piled, and yet moths from the adjoining trees have laid their eggs all over them. This lumber being shipped out of the district would carry potential damage wherever it might go.

Let us suppose that an apple tree containing gipsy-moths were situated at the edge of a strawberry patch. The strawberries are picked, and then are often boxed under the shade of the tree, with the result that the crates in which they are placed may carry the eggs of the gipsy-moth.

The brown-tail moth, on the other hand, passes the winter in silken nests in which leaves are usually enfolded, several hundreds of the young caterpillars being found in each nest. These nests are usually attached to the terminal twigs of trees, but are often found upon nursery stock; in fact, during 1909 many hundreds of these webs were brought in from France attached to imported nursery stock.

The female of the brown-tail moth, unlike that of the gipsy-moth, is a strong flyer, and spreads directly by flight more rapidly than it is as a rule carried in its winter nests. It happens in New England during June that on some nights the brown-tail moth flies in such extraordinary numbers that of a morning the sides of buildings and electric-light poles appear almost white (see page 40).

They are attracted to light to a considerable extent, frequently enter houses and, what is worse, trolley cars and railway cars, and in the latter are apt to be carried for much greater distances than they could possibly fly. In the same way along the seacoast they will fly upon vessels just starting away, and so may be carried along the coast for very considerable distances.

Just as this is being written the news comes that the brown-tail moth has been found during the past winter, probably as a result of last summer's flight, to have obtained foothold on Fishers Island, near the Connecticut mainland; at Orient Point, Long Island; at three points on Shelter Island, and still farther south, on the southern of the two eastern prolongations of Long Island, at six points between Sag Harbor and East Hampton. These points are all in New York territory, and the authorities of that State are fully alive to the danger, so that vigorous efforts are being made to exterminate these incipient colonies.

The brown-tail moth fortunately is not a very difficult pest to control. It is handled by late spring and early fall spraying with arsenicals, but more readily on low-growing trees and shrubs by cutting off and burning the characteristic winter nests, which are very conspicuous in the autumn after the leaves fall.

BROWN-TAIL RASH

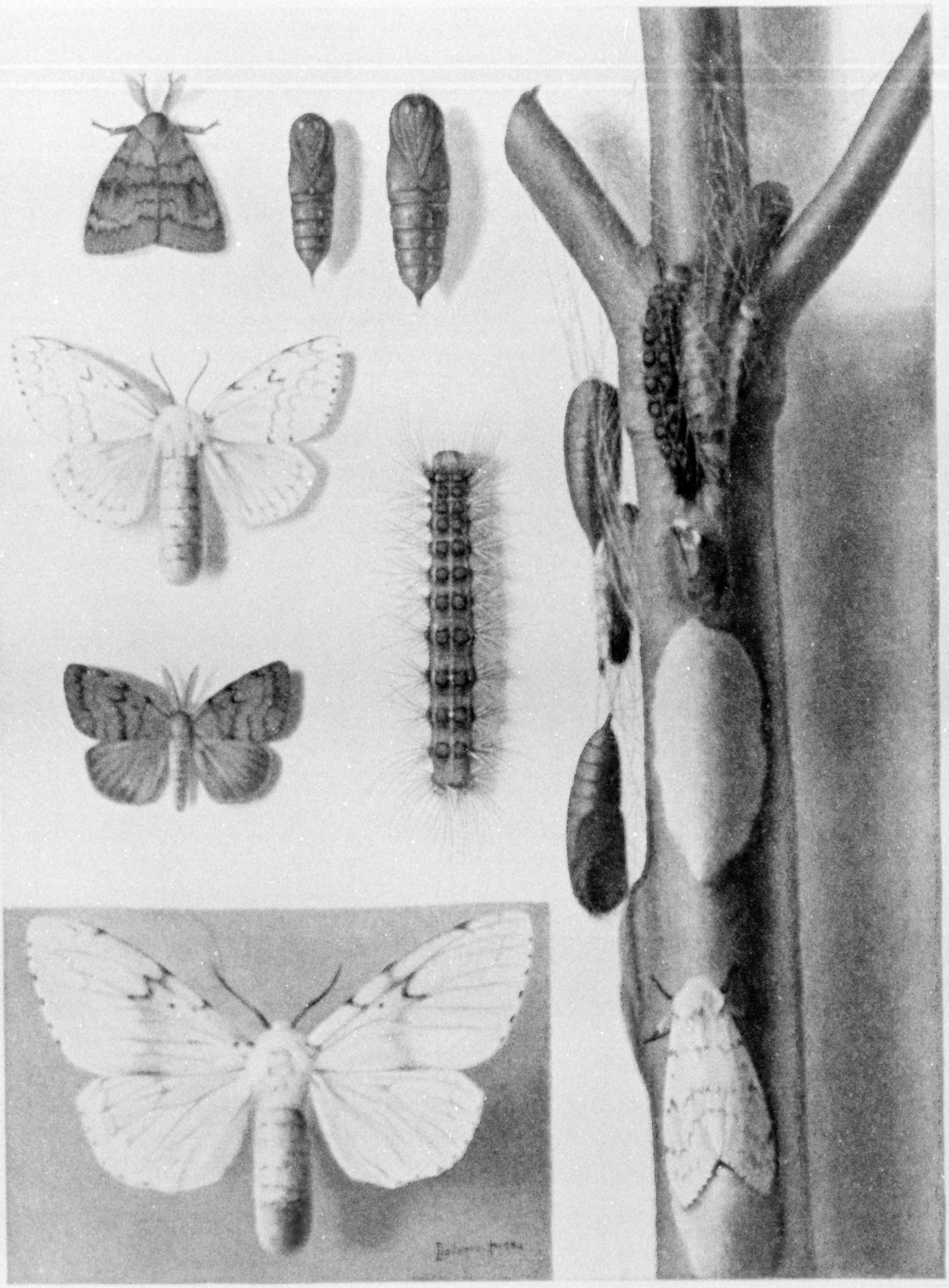
In coming into Long Island territory the principal money loss which the brown-tail will cause is not by the destruction of foliage, but by the prevalence of what has come to be known as the "brown-tail rash," which keeps people away from summer resorts where this insect is prevalent. The hairs of the brown-tail caterpillar are finely barbed and brittle (see page 52), and where the caterpillars come in contact with the human skin these hairs enter the skin pores, break off, and cause a severe irritation.

Indeed, it is not necessary for the caterpillar to come in contact with the skin;

Photo by Paul G. Guillumette

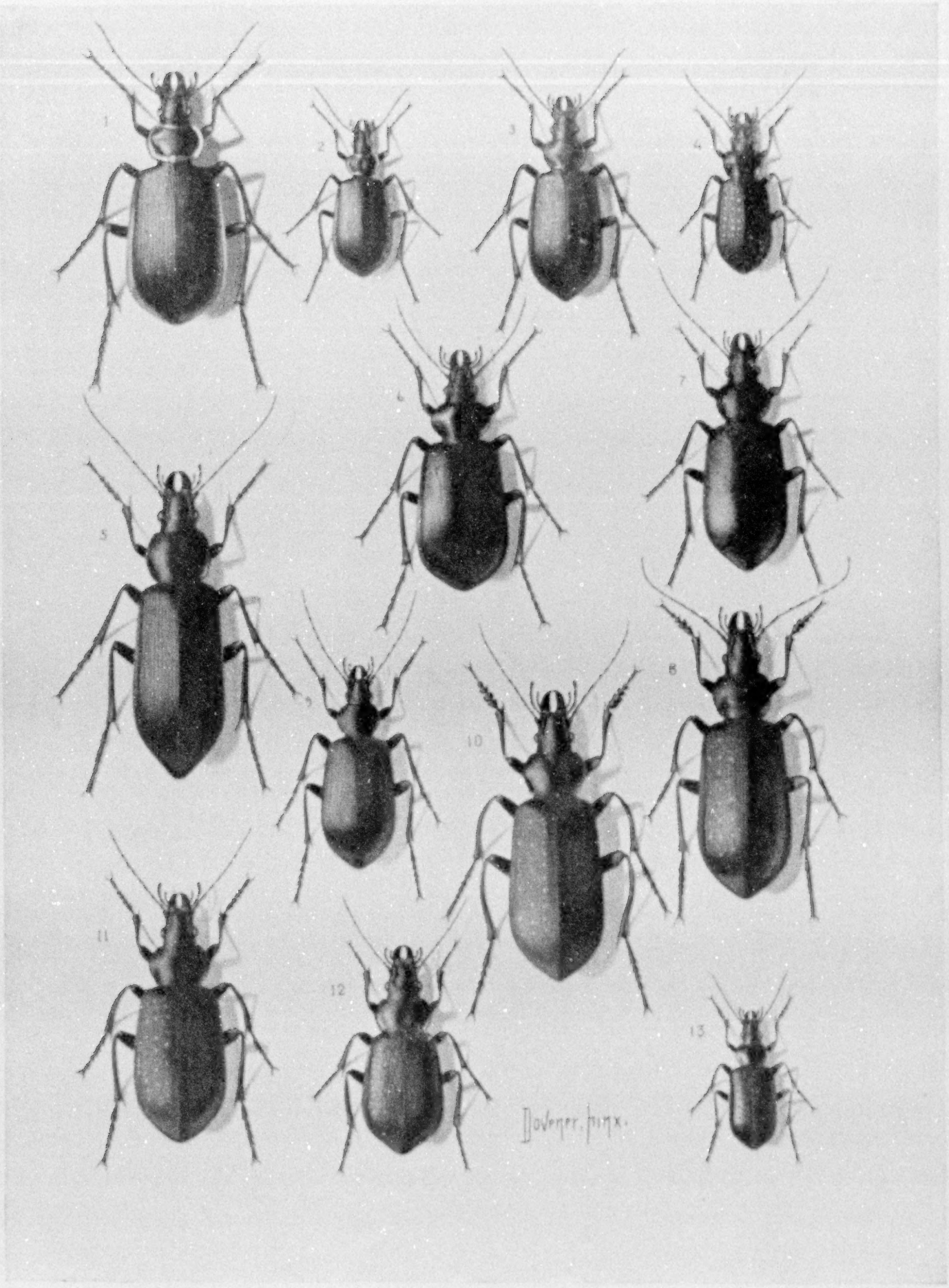
A GHENT FLOWER GARDEN

The city of Ghent has the reputation of being the "Flower Garden of Belgium." Some of the finest specimens of selected varieties of flowers anywhere to be found are bred at Ghent, and King Albert I is the patron of the occasional flower shows where they are exhibited in competition with the thoroughbred flowers of England, France and other parts of Belgium. This photograph, taken on a Lumiere Autochrom plate, represents a scene in the last exhibition in the Horticultural Hall at the World's Fair Grounds at Ghent. The picture makes one wonder which the more to admire—the beauty of the flowers or the power of the camera to interpret the luxuriant colors so faithfully.



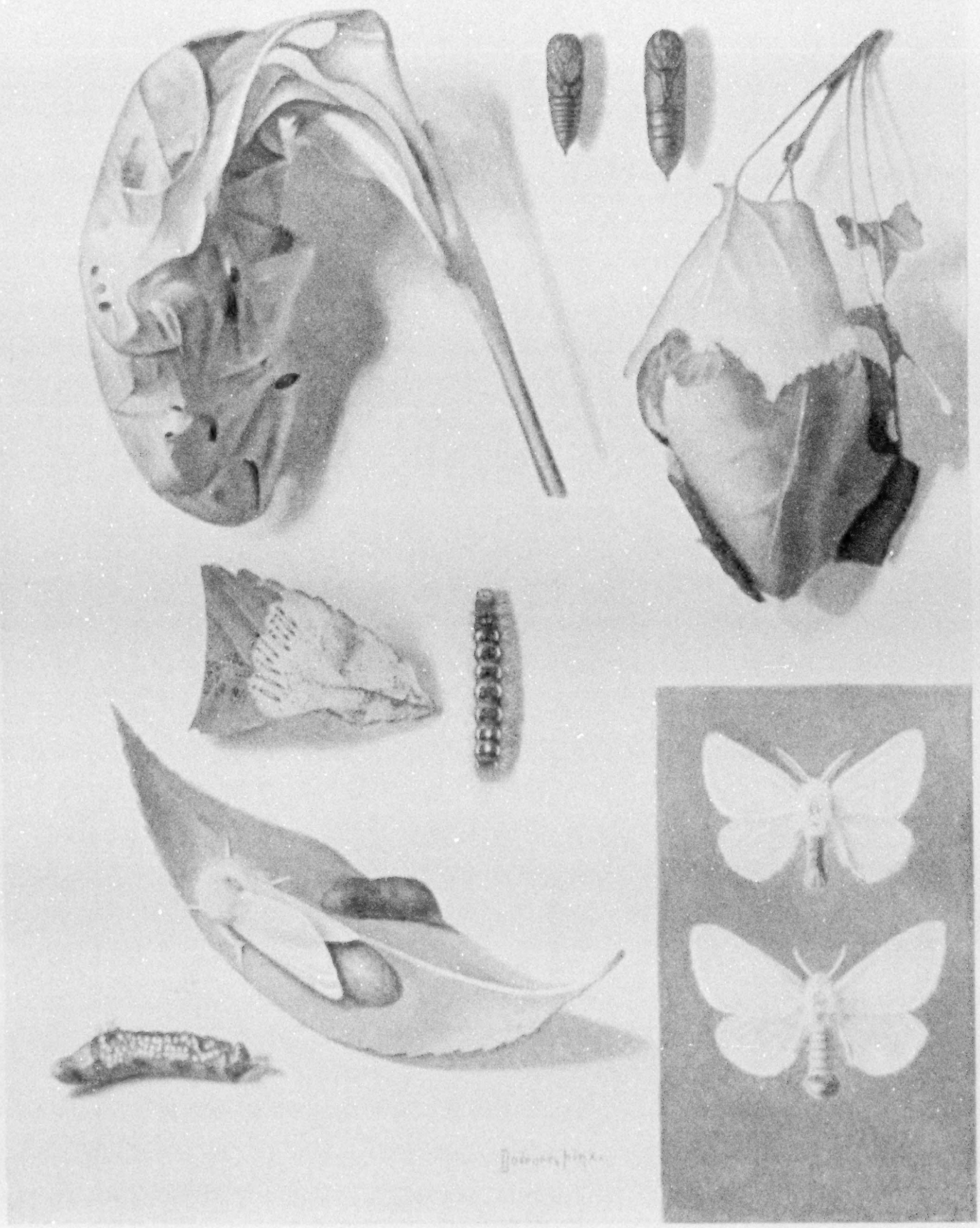
THE GIPSY MOTH (PORTHETRIA DISPAR)

The dark brown moths are the males, and the whitish ones with the dark markings are females. The one at left below is enlarged. On the branch at right, below, the female is laying her egg-mass. An exposed egg-mass occurs above her. The other figures represent the caterpillars and pupæ. See article by Dr. L. O. Howard printed elsewhere in this number.



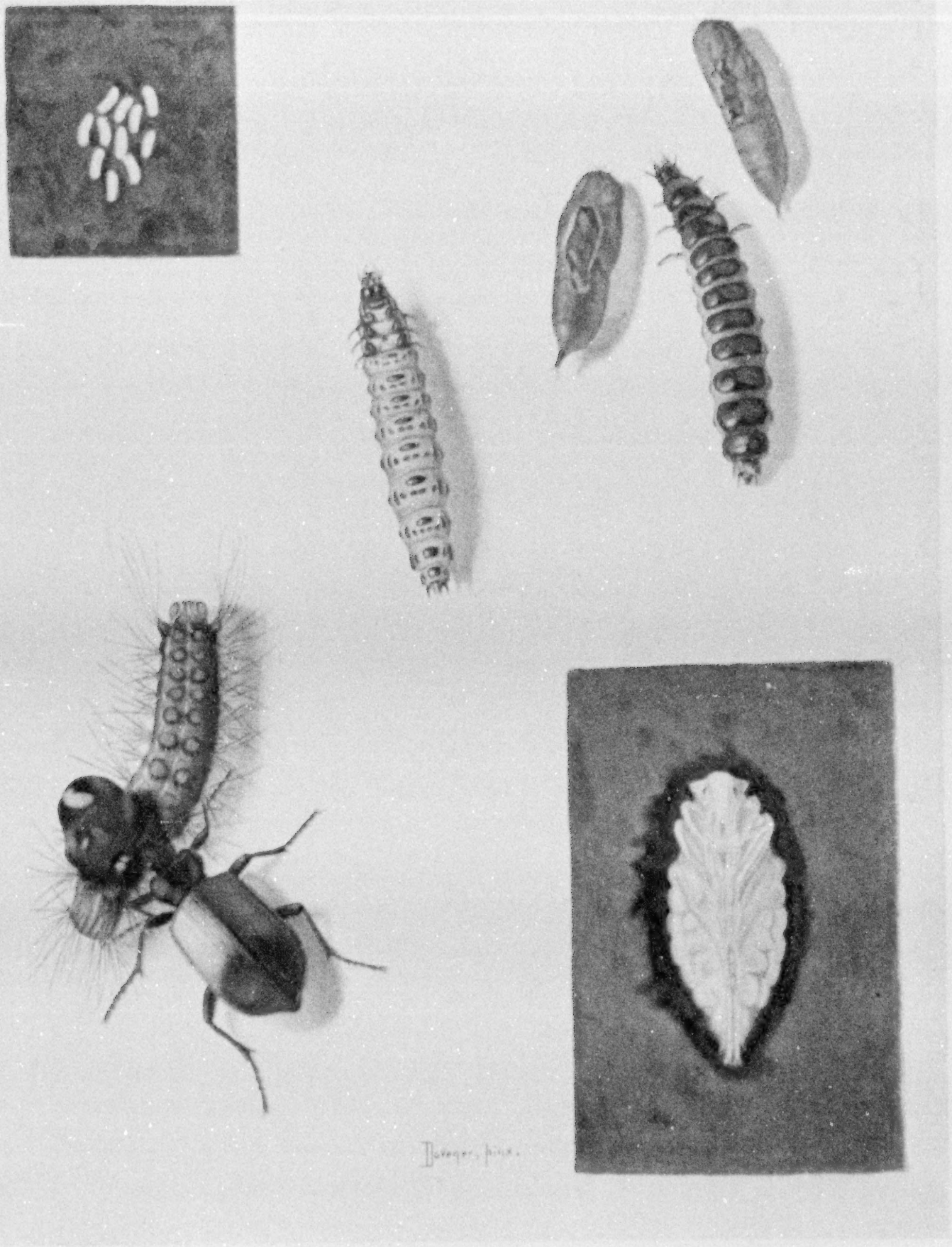
ENEMIES OF THE GIPSY MOTH

Several species of ground beetles brought to New England from different parts of the world to destroy the gipsy moth and brown-tail moth caterpillars. Only one of them has become established in New England.



THE BROWN-TAIL MOTH (EUPROCTIS CHRYSORRHŒA)

The male and female moths below, at right, female laying her eggs, at left. Winter nest above at left; pupæ above near center; larval nest in autumn at right; full grown caterpillar at center, with newly-hatched caterpillars at work on leaf just to the left. Egg-mass below at left.



A BEETLE DESTROYING THE BROWN-TAIL MOTH

(CALOSOMA SYCOPHANTA)

The most successful of the introduced enemies of the gipsy moth and brown-tail moth. Adult beetle destroying a gipsy moth caterpillar, below at left; pupa, under ground, at right; eggs, above left; gipsy moth pupæ and the Calosoma larvæ that destroyed them, above at right.

Photo by Eliza R. Scidmore

THE YOUNG FANCIER IN JAPAN

Some day this little poultry fancier may grow up into a soldier whose first desire will be that the fates may order his blood to be shed for his country, but as yet war's wild alarms have not stirred his soul.

Photo by Eliza R. Scidmore

CROSSING THE BRIDGE, JAPAN

The coolie is wending homeward his weary way after a strenuous day in the rice fields. From the hour of dawn to the time when the evening shadows deepen he must work throughout his life for the bare boon of existence, for his "hire" is but a pittance.

Photo by Eliza R. Scidmore

THE MOST BEAUTIFUL TREE IN JAPAN

This tree enjoys the reputation of being the most beautiful cherry tree in Japan. It stands in the public garden at Kanazawa, on the West Coast.

XUM

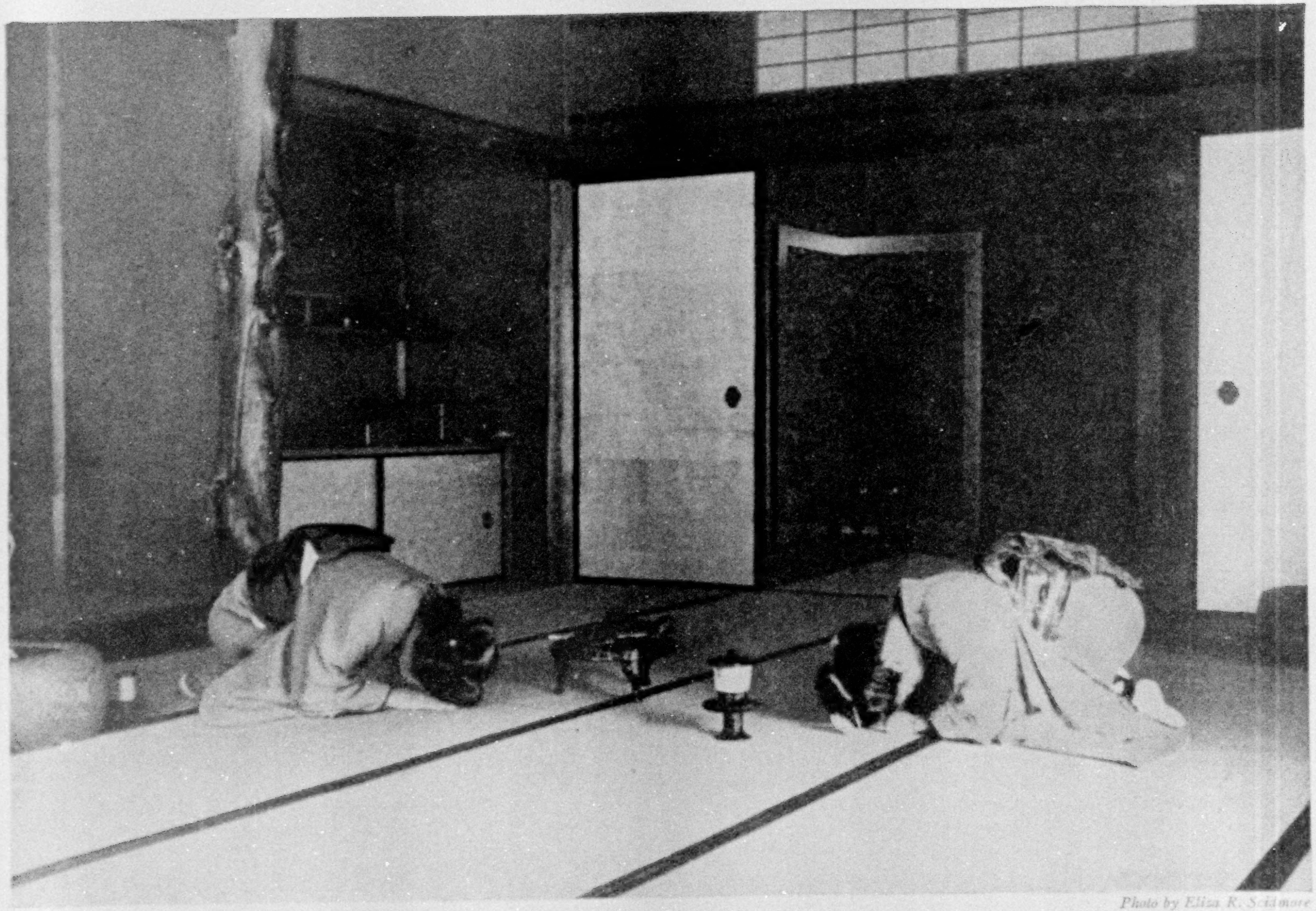


Photo by Eliza R. Scidmore

A CEREMONIOUS GOODBYE

When a formal call is at an end saying "goodbye" carries with it more ceremony, if not more sincerity, in Japan than in Western countries.

Photo by Eliza R. Scidmore

A JAPANESE WEDDING FEAST IS A VERY SERIOUS OCCASION

The bride is the demure little lady second from the end on the right. To her right sits her mother and father. The groom is the third figure on the left, and to his left sits his mother and father.

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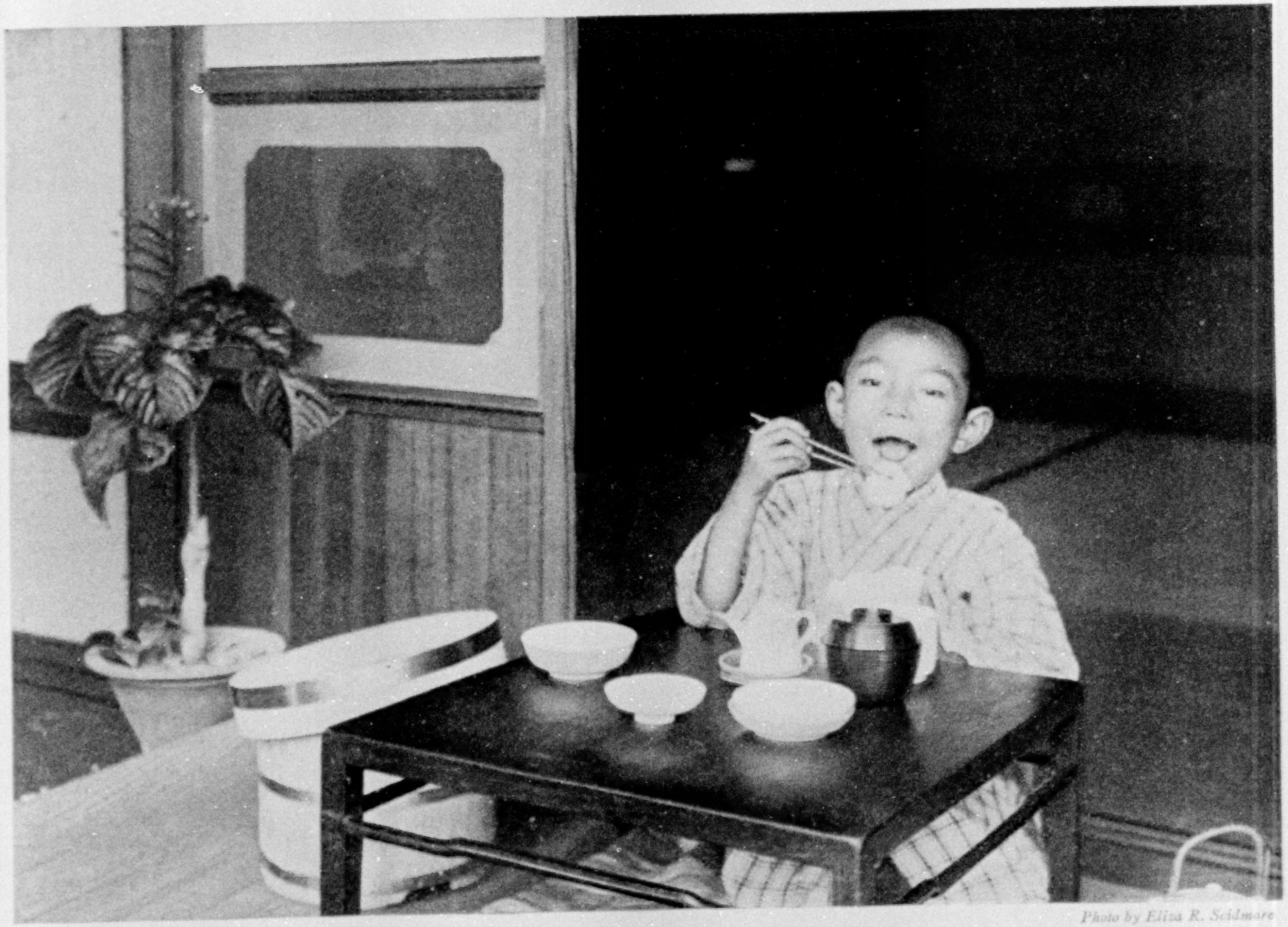

Photo by Eliza R. Scidmore

AT MEAL TIME IN JAPAN

There is a proverb in Japanese which says: "If you love your children give them lots of whippings; if you hate them, lots to eat." This youngster seems to have had no evidences of parental "love" showered upon him lately, as he eats his "honorable rice."

Photo by Eliza R. Scidmore

THE RISING SON OF NIPPON

Young Japan is usually up early in the morning. His bed may not be as comfortable as the downy crib of Young America, his doll may not be as attractive as some on this side of the sea, and his rattle may not be of silver, but withal he usually is the picture of contentment and patience.

Photo by Eliza R. Scidmore

REBELS AT THE BATH

The Japanese child has no fine porcelain bathtub like the American baby possesses. His is a little brass pan, and in this particular instance the water seems to be too cold to please him.

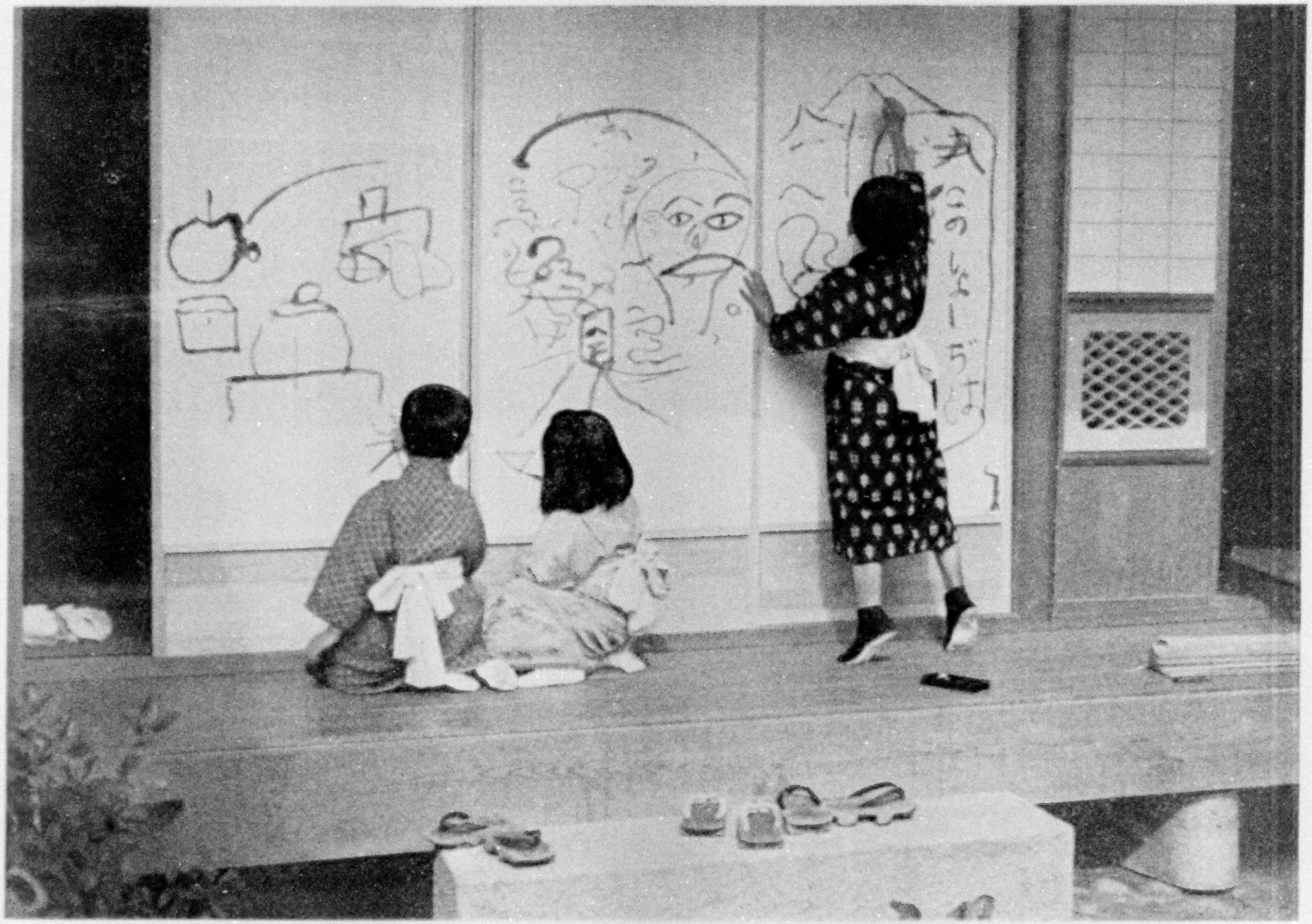

Photo by Eliza R. Scidmore

YOUNG ARTISTS IN JAPAN

Before the paper-hanger comes at the frequent house-cleaning times in Japan the children are allowed to draw pictures on the old paper soon to be removed.

Photo by Elisa R. Seidmore

THE GARDEN FETE

No child's garden party ever pleased children more than the "animal dances" to the tune of the piper in the Japanese garden fete. It gives them a thrill that is equalled only by the American circus parade.

Photo by Eliza R. Scidmore

THE FLOWER GATHERER

In Japan one sees thousands of these bright-faced, flower-kimonoed little children among the blossoms of the garden, and feels that they live the spirit of their clothes and of the flowers.

at certain times of the year hairs are actually floating about in the air. At the time of the caterpillars' change of skin, and particularly at the time of the spinning of the cocoon and the final change, certain of these hairs appear to become loosened in such a way that they are carried by the wind. Some people have been made seriously ill by this so-called rash and it is the cause of great annoyance.

The prevalence of the brown-tail in the New Hampshire woods has undoubtedly lessened the pleasure of many people in their summer camps. Persons engaged in removing the nests from the trees in the winter time, carrying them away to be burned, also suffer from this rash, although the trouble is not so great in the winter time as in the summer, since during warm weather the pores of the skin are more open and receptive to the hairs.

A large part of the popular feeling in New England that the brown-tail must be exterminated is due quite as much to the prevalence and annoyance of this rash as to the loss of vegetation from the work of the caterpillars. While it is true that most of the Long Island summer resorts are seaside resorts, where there is not much foliage, still there are others where the presence of the brown-tail moth will result in deterring visitors.

Further than the actual harm to the skin, the broken hairs which float in the air when the caterpillars or webs or cocoons are disturbed also cause severe internal irritation and poisoning. The death of one man employed in the moth work in New England was due to severe internal poisoning of this kind.

Underclothes and bedding put out upon the line in caterpillar season collect the floating hairs and when used may result in serious poisoning. Doctor Tyzzer, of the Harvard Medical School, has investigated this rash, and concludes that the barbed hairs not only cause a mechanical irritation, but that they contain a poison which acts directly on the corpuscles of the blood.

No remedies suggested are wholly efficacious. Applications which are cooling to the skin, such as witch-hazel or alcohol, allay the irritation to some extent and reduce the suffering. No effective remedy has been found for internal irritation. A formula which has been in frequent use in New England and which is good as a skin application is:

Menthol	10 grains
Zinc oxide	2 drams
Lime water	8 ounces
Carbolic acid	15 drops

SOME NATURAL ENEMIES

Especially interesting and important among the imported natural enemies of both the gipsy and brown-tail moths are the Calosoma beetles, and notably *Calosoma sycophanta* (see page 53). We have a number of species of the genus Calosoma in the United States, but they are distinctly ground-beetles, whereas in Europe *Calosoma sycophanta* climbs trees readily, and its larvæ also climb the tallest trees in search of such leaf-feeding caterpillars as it may find crawling on the trunks and larger branches. Early attempts to introduce this insect into the United States through correspondents were failures.

One naturalist in the south of France once sent over a package in which he separated the individual beetles in matchboxes, putting in each box a meal-worm for food for the beetle. Unfortunately, on arrival in Washington, it was found that in every case the meal-worm had killed the beetle. There were many failures until the best method of sending by mail was discovered, and since that time it has been possible to bring over large numbers in living and healthy condition.

In all, 4,046 living specimens of *C. sycophanta* have been imported from Europe. Sixty-seven per cent of these beetles were liberated in field colonies and the balance were used for experimental and reproduction work. So successful has been this rather difficult work, under the direction of Mr. A. F. Burgess, of Boston, that this beetle now occupies a very large territory in New England, and undoubtedly several millions were at work last summer.

Everywhere through the woodlands about Boston these beetles were to be found in nearly all stages actively at work

destroying caterpillars of the gipsy-moth and the brown-tail moth, as well as native species, while it was difficult to lift a piece of loose bark from an old tree without finding dead pupæ of the gipsy-moth bearing the characteristic slit, shown on page 53, made by the jaws of the Calosoma larvæ.

A number of other species of Calosoma have been brought in from Europe, as well as from Japan and from different parts of the United States, and liberated in the infested territory. None of them, however, is worthy of mention in comparison with the *Calosoma sycophanta,* which has undoubtedly become a permanent denizen of our country and a most beneficial one. Millions of injurious caterpillars will be devoured by them this summer.

It will not be necessary to particularize about the numerous species of true parasites that have been imported. They have been brought in from many different countries, some of them by our own trained men sent out for the purpose, some by paid foreign agents, and very many of them—and this is most interesting—by officials of foreign governments, who have taken no end of trouble to aid us, not only on account of their interest in this wholesale experiment, but as an act of official courtesy to the United States. And it is worthy of note that one of the great amateur entomologists of Europe—M. René Oberthür, of Paris and Rennes—has been of the utmost assistance through his fertile suggestions and active work.

THE EGG-EATING FLY

One extremely interesting parasite, however, may be especially mentioned, namely, the Japanese egg parasite of the gipsy-moth, known as *Schedius kuvanæ,* which the writer had great pleasure in naming after Prof. S. I. Kuwana, of the Imperial University at Tokyo. This parasite is a very minute Chalcis fly, so small as to undergo its entire development in a single gipsy-moth egg. Its existence in Japan was unknown until the demand for parasites for America began.

The first specimens were reared from Japanese eggs sent to this country in December, 1908, and others issued in April, 1909. They bred rapidly, laying their eggs in American gipsy-moth eggs brought into the laboratory and on through the summer at the rate of one generation a month.

By the first of the following year one million individuals were present in rearing cages in the field laboratory, and the following March the parasitized eggs were divided into 100 lots, each of which contained approximately 10,000 parasites, and were put out in colonies, while a large quantity of parasitized eggs remained and were placed in cold storage awaiting the appearance of fresh eggs of the gipsy-moth in the latter part of the summer. This hope was vain, however, and when the eggs were taken from cold storage not a single living specimen remained. By the end of 1910 hopes of the survival of the species in the field were almost abandoned; but, in spite of an apparent enormous decrease in their numbers at that time, the insect has finally accommodated itself to New England conditions and is breeding rapidly and spreading slowly from points where it succeeded in maintaining itself.

In the meantime, although the spread by natural means is slow, the minute adult flying but a short distance, it is being artificially spread and parasitized eggs are being taken into the laboratory, and as soon as the adults issue these are being taken to new localities in tubes (see pages 45 and 47). Each tube contains 1,600 adult Schedius; and two tubes, containing 3,200 adults in all, are used for each new colony. In the laboratory, trays, as shown on page 45, are used for the rearing, each tray being stocked with one million gipsy-moth eggs.

Still another egg parasite, known as *Anastatus bifasciatus,* which was sent over from Hungary by Prof. Joseph Jablonowski, also succeeded. One million five hundred thousand parasites of this species have been liberated during the past year. Eight hundred colonies were placed in towns along the western border of infestation, and the balance were liberated in a number of towns in the northern part of Massachusetts. During November, 1913, collections were

made in New Hampshire from the colonies of this species that were planted a year before, and examination showed that they were practically all successful. In these collections 100,000 parasitized eggs were secured and will be used this season for colonization in New Hampshire.

LOSING THEIR EVIL POWERS

On the whole, then, the outlook is favorable. The work of the government and the different States has resulted in bringing about infinitely better conditions in New England, so far as these pests are concerned, during the past nine years; and while it is practically certain that both gipsy-moth and brown-tail moth will gradually spread to the westward, it is equally sure that the imported natural enemies will come with them and the wilt disease and the fungous disease of the brown-tail as well; and this, with the knowledge which we have gained as to the best handling of the pests, will prevent in all probability in any part of our country the disastrous results which we saw in Massachusetts in the years prior to 1905.

THE NEED OF CONSERVING THE BEAUTY AND FREEDOM OF NATURE IN MODERN LIFE

By Charles W. Eliot

President Emeritus of Harvard University

THE past hundred years have supplied civilized mankind with a complete demonstration that the evils which attend the growth of modern cities and the factory system are too great for the human body to endure; yet these evils are the consequences, or results, of nineteenth-century civilization, and particularly of that form of liberty which the first half of the century developed—individualism. Within the last 40 years a different form of liberty, the liberty of association and collective action, has begun to check some of the evils fostered by individualism, and so to improve the human environment.

The sources of the evils which afflict the population massed in cities are partly physical and partly mental or moral. The collective energies of society are now actively directed to the amelioration of bad physical conditions, and considerable improvements in this respect have already been made; and more are in sight. The study, even, of remedies for wrong mental and moral conditions has hardly begun; yet these are the fundamental evils which must be eradicated, if improved physical conditions are to produce their desired effects.

It is therefore a very practical and urgent inquiry: What influences in the environment of civilized mankind make for mental health, for wholesome interests, for rational pleasures, and for exalting delight in the beauty, grace, and splendor of nature?

By far the most important social study today is the study of the means of improving men's emotion and thought environment from earliest youth to age. These means are both negative and positive—on the one hand they must shut out poisonous excitements and injurious pleasures, on the other they must develop all wholesome mental interests and enjoyable activities of observation, memory, and imagination.

IMPROVE OUR ENVIRONMENT POSITIVELY AS WELL AS NEGATIVELY

In order to cure the destructive evils of present urban life and the factory system, it will not be enough to restrict the vices, to diminish the pressure of poverty, to prevent destructive diseases, and prolong the average human life. The human environment must be not only negatively but positively improved; so that the whole people may have the opportunity to cultivate healthy tastes and interests, to acquire just ideals of pleasantness and beauty, and to learn the value toward tranquil happiness of that living with

A SPLENDID ELM OF CENTRAL MASSACHUSETTS

"The white elm is one of the largest and most graceful trees of the northeastern States. It is beautiful at all seasons of the year; when its minute flowers, harbingers of earliest spring, cover the branches; when in summer it rises like a great fountain of dark and brilliant green above its humbler companions of the forest or sweeps with long and graceful boughs the placid waters of some stream flowing through verdant meadows; when autumn delicately tints its leaves, and when winter brings out every detail of the great arching limbs and slender, pendulous branches standing out in clear relief against the sky."—Sargent's *Silva*.

nature which city congestion has within a single generation made almost impossible for multitudes.

While the exclusion of bad influences needs to be unremitting, the good influences — fortunately for crowded urban populations—need not all be incessantly in action. An occasional holiday in a city park or garden, a week-end in the country now and then, or a fortnight's vacation in summer may make deep and lasting mental impressions, and supply both children and adults with wholesome material to fill the mind and direct its energies for months and years.

Hence the importance of better city and suburban planning, of public reservations of all sorts in city and state, and of national parks and monuments. All these modes of public action tell not only on the physical well-being of both urban and rural populations, but on the mental training of children and on the cultivation in the whole population of thoroughly healthy spiritual interests and uplifting enjoyments, both individual and social.

The profession of landscape architecture is going to be—indeed, it already is—the most direct professional contributor to the improvement of the human environment in the twentieth century, because it is devoted not only to the improvement of housing and of town and city designing, but also to the creation, preservation, and enlargement of opportunities for human enjoyment of mountains and valleys, hills and plains, forests and flowers, ponds and watercourses, spring blossoms and autumn tints, and the wild life of birds and other animals in their natural haunts. These are the things that city dwellers need to have opportunities to see and enjoy; these are the things that serve as antidotes to the unwholesome excitements and tensions of modern city life; these are the delights which, by occupying the mind and satisfying the spirit, keep out degrading thoughts and foul desires.

THE VITAL PROBLEM TODAY IS HOW TO FEED THE MENTAL HEALTH OF MULTITUDES

That good environment can modify favorably the effects of heredity is as true of nations as of individuals. The vital question of modern life is how to feed the mental health and spiritual growth of multitudes. In the modern world life is tightly packed against life, and one life is interwoven with many others. Neither freedom of mind nor health of body can be secured in isolation; for both blessings the individual must hereafter be dependent on social or collective action.

The present evils of city life and the factory system—bad conditions which civilization has itself created—have developed their destructive forces in this country in spite of the schools and churches and of free political institutions, and in spite of many happy influences from art, poetry, music, and the drama. Clearly, society needs to develop a new and better environment for the general life—an environment favorable to both bodily and mental health and to the attainment of genuine happiness—not of mere momentary excitements, pleasures, and gratifications, but of solid contentment, and the lasting satisfactions of life enjoyed in quietness and peace. What are the means of compassing this end?

The readiest means is good planning of city, town, and landscape—first applied to areas still open, and then gradually to areas already occupied in undesirable ways. The new planning must take into account the interests of the whole community, as well as the interests of individual owners, the social or collective interest always prevailing.

The immediate objects to be sought are more light and air for dwellings, offices, shops, and factories, and thus a spreading out of cities; the transfer of factories to suburbs and to country sites along the lines of railway; the multiplication of playgrounds and open decorated areas, and above all the attachment of a piece of arable or garden ground to every family dwelling. Many of these results can certainly be attained; and indeed much work of this sort is already started in regulating the height of buildings, transferring factories and setting up new plants in smaller towns, enlarging school yards, and creating public parks and gardens.

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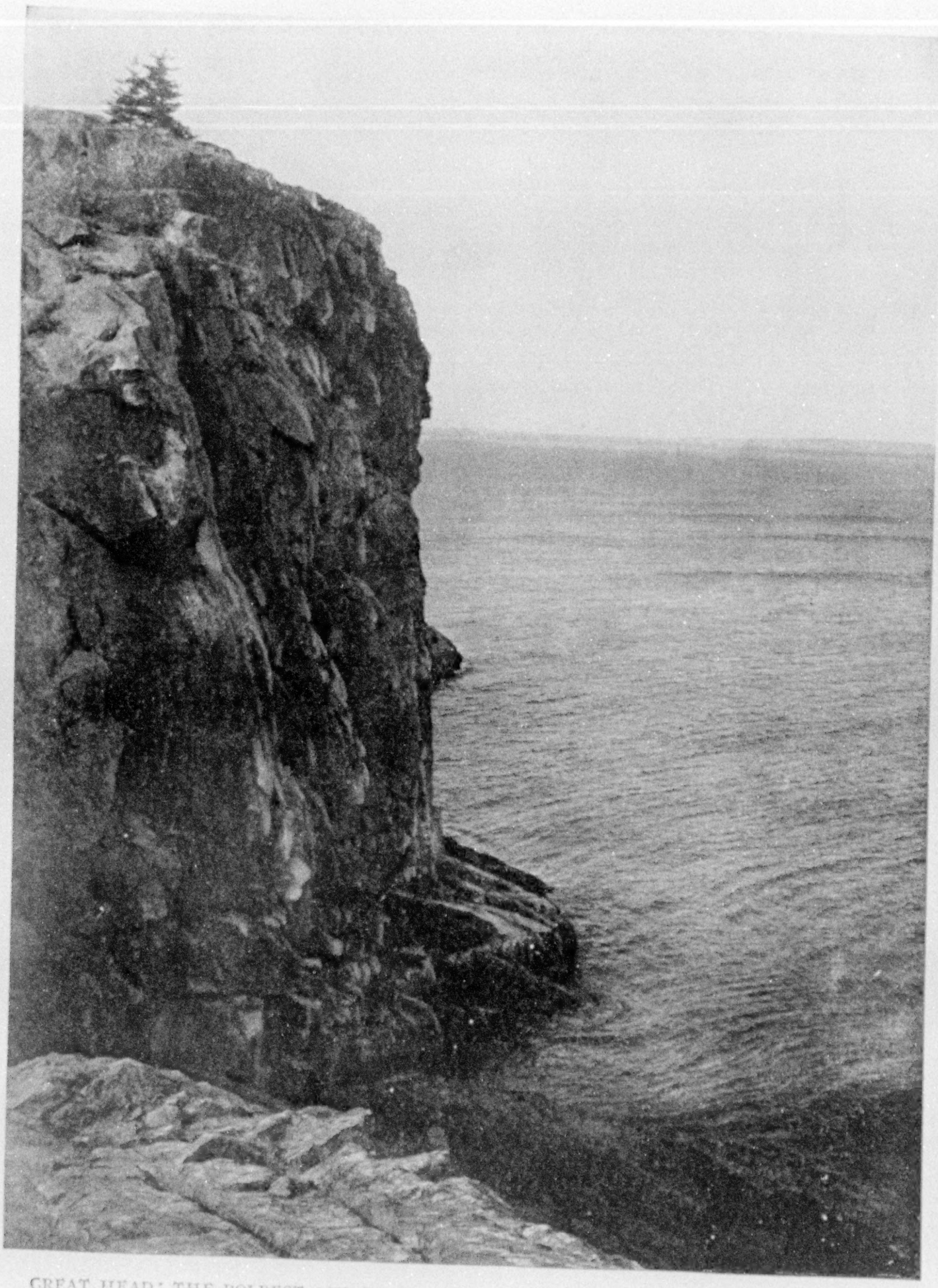

GREAT HEAD: THE BOLDEST AND THE HIGHEST HEADLAND ON THE AMERICAN COAST FROM THE ST. LAWRENCE TO THE AMAZON

In occasional great winter storms the sea breaks over the top in sheets of spray—a wonderful thing to see

BEAUTY BRINGS CHEERFULNESS AND SOCIAL HAPPINESS

The housing problem for mechanics and operatives has already been solved in a business way by the English Garden City. In cities already too compactly built and with too lofty structures the improvement of the human environment must await better understanding of life's needs or change of taste in populations now unwholesomely congested. With the diffusion of knowledge concerning healthy and happy conditions for family life and the industrial life of the laborious masses this reformation of our cities and manufacturing towns will surely come about, but in coming about it must take account of something more than water supplies, sewers, and street lights; it must take account of beauty and of all that brings cheerfulness and social happiness.

The collective force of the community must further supply the means of making rural and landscape pleasures occasionally accessible to city populations by means of parks and gardens which illustrate all forms of open-country beauty and permit the occasional enjoyment by city families or larger urban groups of the outdoor pleasures which woods, shrubberies, gardens, and broad fields can give. All city dwellers greatly need these occasional delights, and Americans more than any other people; for they have become accustomed to an indoor life, and have come to rely on electricity as a substitute for sunlight, and mechanical ventilation as an equivalent for fresh air. Even the richer sort of Americans are often content to live in houses in which at least one-third of the cubical contents cannot be used without artificial light the year round, and to occupy offices in which electricity has to reinforce sunlight during the greater part of the year.

The proper use of the natural materials for creating on public ground fine landscapes, gardens, and scenes of rural beauty involves an extensive study of these materials. The landscape architect must know how to use a near or distant prospect of hills and woods. He must know the trees, shrubs, and herbaceous plants valuable in landscape or in gardens, or along walks and drives where thousands of people daily pass. He must know all the native materials for creating scenes of beauty, and all the imported materials which have proved available in the climate of the reservation he plans. And in order that the landscape architect may have the opportunity to study these materials, society must furnish places where they may be assembled, appropriately used, and thoroughly tested.

ENCOURAGE PUBLIC INTEREST IN ANIMAL AND VEGETABLE LIFE

In other words, the collective force of society should be used to provide and maintain living collections of these materials of landscape and garden beauty, where climate, soil, and scenery make it possible to assemble, cultivate, and exhibit them advantageously. The botanic gardens and arboretums which universities and governments maintain do not fully answer this purpose, although they contribute to it; because the lay-out of the botanical gardens and arboretums is made for a scientific purpose quite different from that which directs the thoughts of the landscape architect.

There is another source of keen enjoyment for city people which should be provided for when parks, gardens, and playgrounds are constructed for their pleasure, namely, the natural interest in animal life as well as vegetable life. Most men and nearly all women take a keen interest in bird life—in the migration, nesting, family life, and feeding habits of birds, both land birds and sea fowl. It is one of the advantages of suburban over city life that many varieties of birds can be seen and studied in the suburbs. The collective force of society, therefore, should be exerted to preserve all the species of birds which are profitable, not only for food and crop protection, but also for the stirring of human sympathy and delight in their colors, songs, and alert, sprightly ways. The provision of sanctuaries for birds, of closed spaces as well as closed seasons, is a highly expedient use of the collective protective force of society against individual destroyers of bird life.

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A TYPE OF ELM FOR WHICH NEW ENGLAND IS FAMOUS

This tree is doubtless several hundred years old and has many scores of years of natural life left, as the elm reaches a maximum age of about 500 years, grows to a height of about 120 feet, and attains a maximum diameter of about 11 feet. No other tree in the United States has been so extensively planted for ornament and shade.

The government of the United States has begun to use effectively its constitutional powers for improving the environment of the people by conserving broad scenes of extraordinary natural beauty and single beautiful or striking objects which, without the protection afforded them by government, might be lost to future generations. The national parks are reserved by act of Congress; the President, by executive order, may and does order the preservation of smaller areas or single objects under the title of national monuments. State legislatures have begun to provide State reservations, and have authorized municipalities, or special districts, to acquire both large and small parks. Chartered bodies of trustees have been authorized by State legislatures to acquire and hold considerable areas for perpetual public use.

THE PLAN FOR A NATIONAL MONUMENT AT MOUNT DESERT

On the beautiful island of Mount Desert, not far from the northeastern extremity of the Atlantic coast of the United States, there is at this moment opportunity for establishing a national monument of unique interest and large serviceableness. The island is the loftiest piece of land on the Atlantic coast of the United States, and has a sharply differentiated surface of hills and valleys, a climate midway between that of the neighboring lands and that of the surrounding sea, abundant water, and in favorable spots a highly productive soil, well suited for growing a wide variety of trees, flowering shrubs, and herbaceous plants belonging to the temperate and subarctic regions of the world.

Private initiative and enterprise have long since demonstrated the peculiar fitness of the Mount Desert climate and soils for horticultural and arboricultural uses, and leading botanists and garden experts have testified to the remarkable thriftiness of plants grown upon the island, as well as to the unusual beauty and rich coloring of their blooms.

A body of trustees, called the "Hancock County Trustees of Public Reservations," has already acquired the wooded slopes and rocky summits of many of the principal hills, and holds them for perpetual public enjoyment. Possession, too, has been secured by public-spirited private persons of considerable areas exceptionally fitted for the growth and exhibition of all varieties of trees, shrubs, and herbaceous plants which the landscape architect might use in developing all across the continent, in northern climates, parks and gardens for the enjoyment of city populations. Here, too, all the bird-food plants could be appropriately cultivated and bird sanctuaries provided. The cultivated tracts would have a noble background of rocky cliffs and lofty hills, and down the valleys and gorges visitors would look out from time to time over the near bays or the distant ocean. Here, in short, could be brought together under highly favorable conditions and in great variety the botanical and zoölogical materials of the landscape and garden designer.

If the government of the United States should set aside as a national monument a large area on this picturesque and unique island, it would help to consecrate for all time to the improvement of the human environment one of the most beautiful and interesting regions in the whole country; and in so doing it would take appropriate part in resisting and overcoming the destructive influences on modern civilization of urban life and the factory system.

The powers of the national government have thus far been exerted to these conservation ends chiefly in the Far West, where population is sparse and the evils of city life and the factory system are little developed. Is it not just and highly expedient that these beneficent powers should now be exerted in the East, where manufacturing industries occupy the major part of the population and the destructive effects of city life have long been manifest?

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VIEW FROM THE GREEN MOUNTAIN TRAIL

One looks seaward over a vast ocean plain stretching forty-odd miles away to the horizon. The inlet on the shore is Otter Creek, a little harbor inclosed by bold, surf-beaten headlands, and one of the most picturesque spots upon the coast. On the right the county road continues on along the coast to Somes Sound, the fiord which another picture shows, and beside whose entrance the Jesuit settlement of 1613 was made.

THE UNIQUE ISLAND OF MOUNT DESERT

By George B. Dorr, Ernest Howe Forbush, and M. L. Fernald

MOUNT Desert Island, a unique and striking landmark from the sea, was the first land to be approached, described, and named—with the name which it still bears—in the earliest recorded voyage of exploration made along the coast of Maine to the eastward of the Kennebec.

In the early days of September, 1604, when the poplar trees and birches of the northern forest were first commencing to turn to gold amid its then abundant pines and dark-green spruces, Champlain sailed from the eastward down that wild and unknown coast until the bold range of the Mount Desert hills, with their bare rock peaks and deep dividing valleys, ice-eroded, rose before him. Turning then, he sailed up into the noble bay that bounds the island on the east and which still bears the name of Frenchmans Bay, and—nearly wrecking on the way, in gathering dusk no doubt, his big, lateen-sailed, open boat upon a rock that was awash—anchored for the night.

The next day, after having explored the upper bay to the Narrows, where a bridge connects the island with the mainland now, he sailed on around the deep, sheer headlands of primeval rock—unequaled on our coast—that oppose their surf-formed precipices to the open sea, and came into island-sheltered waters on the southern side, where he made friends with Indians, who presently guided him up the Penobscot River, the eastern extremity of whose mouth he describes the Isle des Monts Deserts as forming.

The lesser islands, islets, and sea-girt rocks he passed upon the way were so numerous, he tells us, that it was "marvelous to behold"; and among them some were very beautiful and contained fair meadows, while the oaks upon one side of the river bank as he ascends appear as though "planted for ornament"; on the other the pine forest grew.

THE "MAYFLOWER" OF THE FRENCH

Nine years later the French returned to Mount Desert, thither led by God, the Jesuit narrator says, across a dangerous and fog-hidden sea, to form for a brief while the only colony from oversea ever established by the French upon this country's northern coast in their long contest with the English for America.

In a small vessel of a hundred tons, which Parkman calls the *Mayflower* of the French, laden with goats and horses, seed-grain, stores, and agricultural implements, the colonists set sail from Honfleur, on the coast of France, in the first days of spring, 1613. It was late in May when they came to rest beneath the deeply shadowed cliffs and wooded hills of Mount Desert and lay in safety in a pleasant harbor on its eastern shore.

Landing there, they raised the cross, held mass, and named the place, in thankfulness for the guidance given them to so fair a spot, Saint Sauveur. Later, however, persuaded by Indians encamped beside the shore where North East Harbor is today, they sailed around to the mountain-guarded entrance to Somes Sound—the one true fiord upon our coast—and there established their little colony upon a pleasant hillside sloping gently to the sea and bathed on either side with springs; upon the earth, "black, rich, and fertile," the grass grew "tall in places as a man." This place looked out to the southeast upon a sheltered harbor "where a fleet might ride in safety," but into whose peaceful waters an English foe came sailing one fair morning later on and wrecked the colony.

"Thus," Parkman says, "in a semi-piratical descent, an obscure stroke of lawless violence done at Mount Desert began the strife of France and England, of Protestantism and Rome, which for a century and a half shook the struggling communities of North America, and closed at last in the memorable triumph of the English on the Plains of Abraham.

THE COMING OF JOHN WINTHROP

Twenty-one years later still—upon the 8th of June, 1630—John Winthrop, bringing the charter to the Massachusetts

SOMES SOUND: THE ONE TRUE FIORD ON THE ATLANTIC COAST OF NORTH AMERICA, FROM NEWFOUNDLAND SOUTHWARD

The mountains inclose it precipitously on either side as it passes through the granite range, while the depression which forms it nearly cuts the island into two beyond. It forms a magnificent natural harbor, deep enough to float the largest transatlantic steamers

colony at Salem and its appointed governor, sailed by between the island—whose lofty heights he makes the western "Cape," or boundary, of the Bay of Fundy—and Mount Desert Rock, finding there "fair sunshine weather and so pleasant a sweet air as did much refresh us; and there came a smell from off the shore like the smell of a garden."

That day there came a wild pigeon, too, and rested on his ship—a species now extinct through wanton slaughter—and he tells how they put the ship a-stays in 30 fathoms of water, and took "in two hours, with a few hooks, sixty-seven codfish"—and very great fish they were, some of them a yard and a half long and a yard in compass; and how a whale lay in their way and "would not shun them," so that they sailed by within a stone's throw of him as he lay spouting water, with his back hunched up a yard above the sea.

A GIFT TO THE NATION

Three centuries—a few years more or less—after Champlain sailed beneath the granite range of the Mount Desert mountains and the French colonists had broken ground upon the fertile shore, a group of summer residents, who had long found pleasure in the various beauty of the island and a restful home upon its shores, gathered in response to a call from Dr. Charles W. Eliot, then president of Harvard University, to associate themselves together for the purpose of conserving the wild, inspiring beauty—supreme in its own way—the many-sided interest and open freedom of the nature which had meant so much to them.

Gradually the undertaking thus begun has grown, till now the association holds between five and six thousand acres on the island in one continuous reservation, which includes the highest mountain peaks and the greater part of the watershed of the high-lying lakes between them whence the water supplies of the residential portions of the island are chiefly drawn. The area also includes much forest land, with deep valleys which offer admirable shelter for wild life, open marshes and pools suitable for wading and aquatic birds, streams on which beaver formerly built their dams and which would make fit homes for them again, and the best opportunity along the whole Maine coast for preserving and exhibiting in a single tract its native flora.

This ownership the association hopes ultimately to extend, as opportunity to do so at reasonable cost shall offer, till it includes the whole range of bold, ice-worn granite hills, from 12 to 15 miles in length, which extends across the island, offering magnificent views of sea and land, together with the cool lakes, the wooded valleys, and the one noble fiord on our Atlantic coast which lie between them.

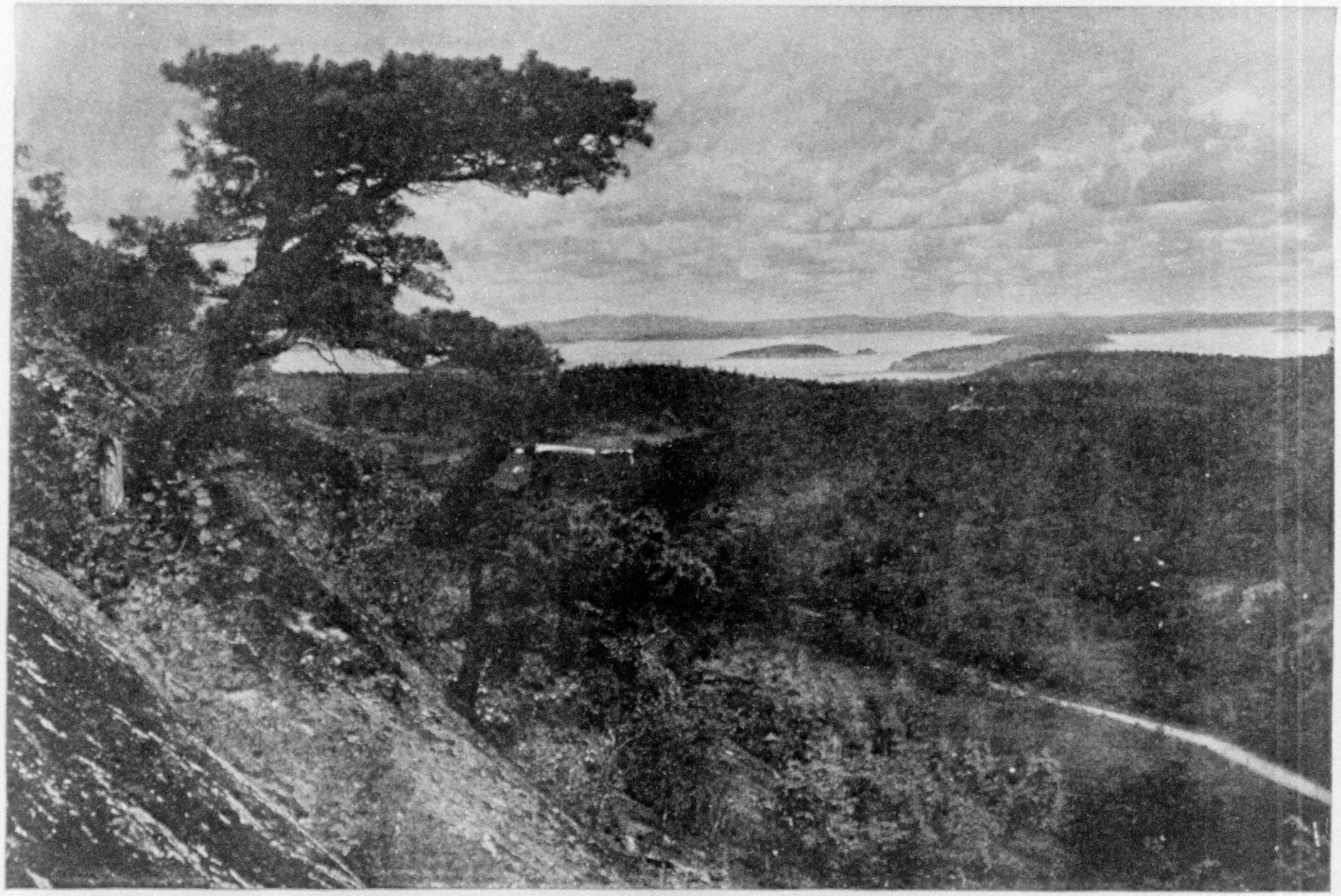
The completion of this purpose will create a wild park of remarkable beauty, unique character, and great variety of landscape feature, whose permanent and best development in accordance with the spirit of their undertaking the members of the association feel will be provided for most wisely by placing it—except in special portions carefully selected and set aside for arboretum and other educational or scientific purpose—in the hands of the Federal government as a gift to the nation.

Saved to future generations as it has been to us, in the wild primeval beauty of the nature it exhibits, of ancient rocks and still more ancient sea, with infinite detail of life and landscape interest between, the spirit and mind of man will surely find in it in the years and centuries to come an inspiration and a means of growth as essential to them ever and anon as are fresh air and sunshine to the body.

MYRIADS OF LAND AND WATER BIRDS *

When America was first discovered the coast of Maine was the habitat of myriads of land and water birds. Champlain, in his account of his second voyage along that coast, tells of the multitude of fowls of the air which he beheld. Hakluyt, in his "Discovery of Norumbega,"

* The preceding paragraphs are by George B. Dorr; the succeeding paragraphs, until the heading "Mount Desert contains a greater diversity of plant life, etc.," by Ernest Howe Forbush, and the concluding paragraphs, beginning with the above heading, are by M. L. Fernald, Curator Gray Herbarium, Harvard University.



A SPLENDID VISTA

Upper Frenchmans Bay lies in the distance, the Gouldsboro Hills beyond. Below lies the gorge—a deep, precipitously rock-walled passage, ice-eroded, through the granite chain—which makes the natural highway between the Bar Harbor region and the southern shore

mentions particularly "the great plentie of foules." Rozier, in his narrative of Weymouth's voyage to the Maine coast in 1605, speaks of "many fowls of divers kinds" as breeding upon the islands. He mentions particularly eagles, hernshaws (herons), cranes, ducks, great geese, swans and penguins (great auks), crows, shrikes, ravens, mews, turtle doves (passenger pigeons), and "many other fowls in flocks unknown," and speaks of cranes especially as breeding on these islands. Levett again, in his "Voyage to New England," 1623, speaks of "a world of fowl" along the coast.

This coastal region is indeed wonderfully fitted to be a great nesting ground and feeding place for both land and water birds.

The coast-line is so broken with deep, irregular indentations and the islands lying off it are so numerous that from Casco Bay to the Canadian boundary it presents to the wash of the tides more than 2,500 miles of shore. All along the coast there are broad flats and salt-marshes extending deeply inland which are swept over twice a day by the tide's great flood, rising from 12 to 13 feet in the Mt. Desert region; and every recurring tide for ages past has brought and deposited upon these flats and marshes quantities of floating marine life, while countless animal and vegetable forms grow upon and in their fertile bottoms.

In the early days, when every tide went out, great multitudes of birds of many species found a bounteous repast spread for them along that vast stretch of coast. Yet, although food conditions for them are almost as favorable today as they were when Champlain first explored these shores, only a pitiable remnant of the birds remains.

MANY HAVE UTTERLY DISAPPEARED, BUT MANY MAY STILL BE PRESERVED BY PROMPT MEASURES

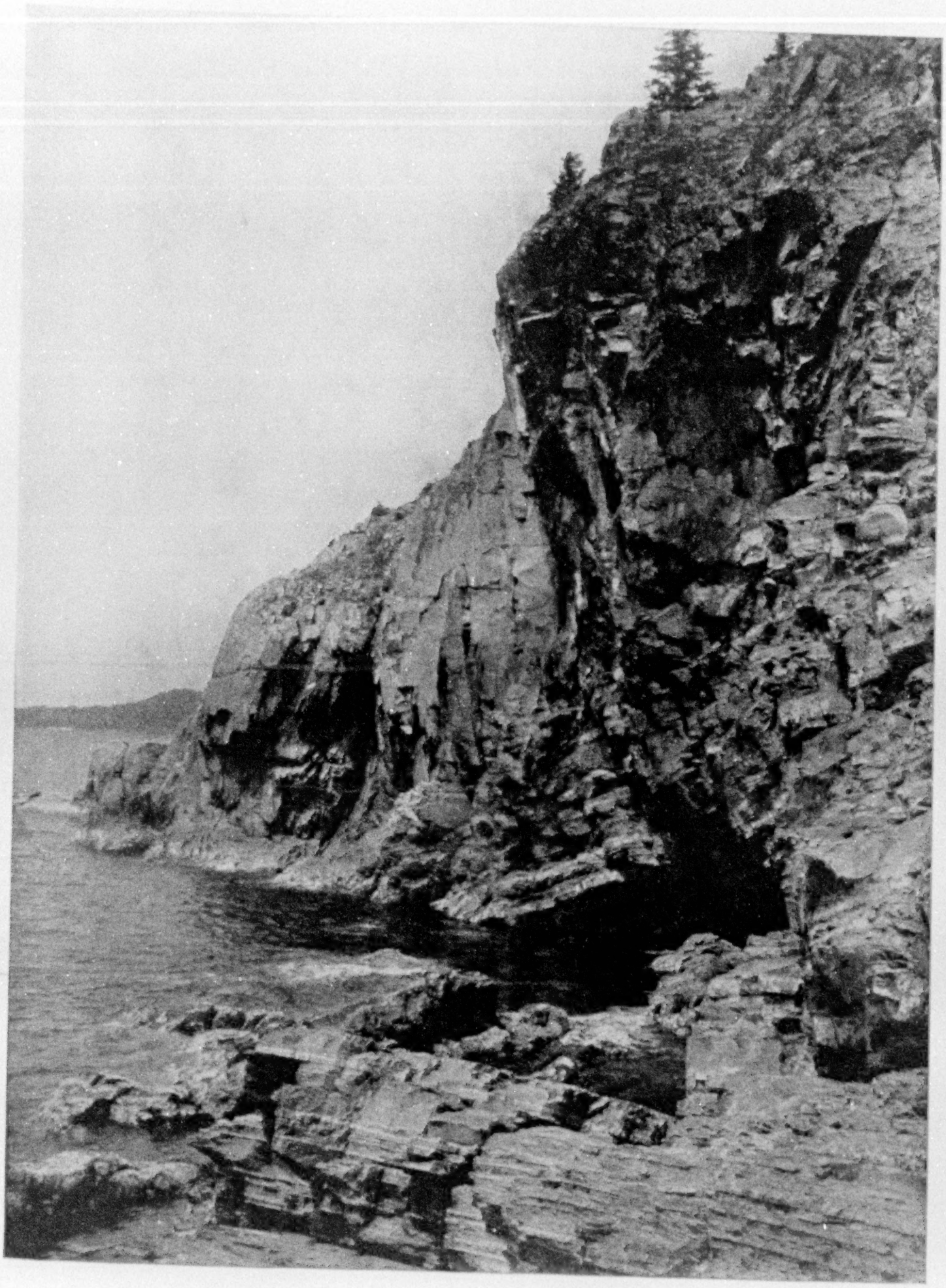
The continual hunting and shooting of birds throughout the Atlantic States and the maritime provinces, with the destruction of their nests, eggs, and young for food and commercial purposes, has swept the coast like a destructive storm, annihilating far the greater part of the bird life that formerly existed there. The multitude of swans, snow geese, great auks, wild turkeys, and wild pigeons that were seen by the earlier explorers are gone, and with them are also gone the Labrador ducks, cranes, spruce partridges, ravens, and eskimo curlew, while many other shore birds and water fowl have become rare almost to disappearance, although prompt measures still would bring them back.

The Maine coast is not alone in this, for recent explorers tell us that northward along the unprotected coasts of Nova Scotia, Newfoundland, and Labrador the nesting wild fowl and shore birds are disappearing so fast that now the eastern coast of Maine, where occasional island colonies of these birds have been given some protection by the National Association of Audubon Societies, offers the best opportunity existing for saving from destruction the typical water birds which once bred so abundantly along the whole northeastern coast of North America.

It now seems as though the tide were turning and that the destructive evils of the past may at last be stayed. The recent action of Congress in enacting a national law for the protection of migratory birds gives encouragement to the hope that it may yet be possible to foster and gradually bring back to some measure of the old abundance and variety the valuable—and, once lost, irreplaceable—wild bird-life of this continent. But the enactment of laws alone will not secure results.

All who speak with knowledge now agree that no plan for the preservation of birds in any country can succeed unless adequate and well-placed bird refuges and absolute sanctuaries are provided, where all shooting or disturbance of the birds is prohibited, where the birds that breed locally can nest in safety, and where migratory birds of the farther north can find shelter, protection, and food in their migrations. Every year's delay counts heavily against the birds.

Over 900 million shot-gun cartridges are sold in the United States each year and more than 100 million in Canada. Great numbers of muzzle-loading guns



THE SEA-GULLS' HOME

A seaward-facing cliff of immeasurably ancient Cambrian stone, formed of clays and sands washed down from a vanished continent older probably than life of any sort on land. These were deeply buried subsequently and turned by pressure into hardest rock, but the sea-laid strata still show clearly in the foreground.

also are used by foreigners, Indians, and people on the border-line of civilization, of whose loose ammunition no record of amount can be obtained, and great quantities of birds are slain by immigrants with cane-guns, snares, nets, bird-lime, etc. The forces of destruction are constantly increasing and the need of sanctuaries where no shooting will ever be allowed has grown urgent to the last degree.

THE PATHS OF THE GREAT BIRD MIGRATIONS CONVERGE AT MOUNT DESERT

The shape and geographical position of the continent of North America is such that during the migration seasons bird-life goes crowding up or down this country's coasts, both Atlantic and Pacific. This is due to the much greater width and vast extent of the continent to the north of us and to the great feeding ground and natural line of travel offered by the shore to both land and water birds upon their flight.

On the Atlantic coast from the Bay of Fundy southward this effect of concentration is particularly great and must in early days, when birds were plentiful, have made it, during the migration seasons, a marvelous sight.

A third great highway of migration flight lies along the Mississippi Valley, and along all three of these great natural routes it is necessary that bird reservations should be established. But extensive tracts have been already set aside for this purpose by the government along the Pacific coast, and reservations on a vast scale are now in process of establishment, through private gift, along the Louisiana coast to the westward of the Mississippi mouth.

It remains for us in the east, where the bird life was once so abundant and the need came earliest, to do like work; and nowhere is there work of more importance to be done, nowhere is the need of the present day so critical.

The tendency of most migratory birds nesting on the eastern third of the continent is to fly southeastward from their nesting grounds until they reach the coast and then to follow it on southward, guided apparently by prominent landmarks spread along the coast, or to strike out presently across the sea to the Antilles.

When the autumn frosts come, migratory birds from Greenland, from all the shores of Baffins Bay, from Labrador and Newfoundland, from the cultivated lands of eastern Canada and all the wild interior beyond, pour their diminished legions down toward the Maine coast; in the springtime they return and spread out northward from it.

Thus Mount Desert Island, unique in being the only mountainous tract thrust prominently out into the sea, offers an important landmark and admirable resting place for migratory birds of every kind—birds of sea and shore, the useful insect-eating birds of cultivated lands, of woods and gardens, the birds of marsh and meadow lands and inland waters.

THE BIRDS OF AT LEAST FOUR FAUNAL ZONES NOW BREED AT MOUNT DESERT

The fauna and flora of the coast-line at this point are largely of the Canadian type and its birds are represented here with corresponding fulness. Nevertheless, a number of Hudsonian plants grow upon the island also and form breeding places for certain birds characteristic of that northern area. This is one of the very few points on the Atlantic coast of the United States where portions of this far northern flora and fauna can be found at all, and it is the southernmost of them all.

Following the coast up from the west and south, a number of the birds of the Alleghenian and transition zones reach the island also, and we thus find at least four faunal areas represented in summer at this unique spot, while a number of Arctic and other northern birds frequent the region in winter, at which season the Alaskan eagle and the snowy owl appear.

Remarkable opportunities exist here, accordingly, for inducing birds of many kinds to remain and nest upon the island, where they can be fostered, studied, and protected. For the birds of farm and garden it offers conditions that might readily be made ideal in certain sections. The growing forest cover provides admirable nesting places for all woodland

THE OCEAN FRONT UPON ROUND PORCUPINE

An island guarding the entrance to Upper Frenchmans Bay. This island is the hard rock-core of a hill that once rose above the stream-worn valley of the present bay; for the coast of Maine is what geographers call a drowned one—an old land-surface sunk beneath the level of the flooding sea—and it is this which gives it its bold character and remarkable extent, the greatest in the country next to Florida.

birds. For the birds of inland and of tidal waters the place is singularly favorable, while the vertical cliffs may yet call back to nest the raven and the eagle.

No northern situation was ever better fitted to grow a great variety of fruiting plants for bird food. The remarkable horticultural qualities of the island have long been recognized, and both wild and cultivated shrubs fruit there with an extraordinary profusion. In the deep valley, especially, which extends from the Bar Harbor region, and the great wooded heath to the south of it, through the wild mountain gorge with tarn-like bottom marsh and open pools that makes a natural highway for the birds between the northern and southern shores, there are wonderful sites for bird shelter-woods and bird-gardens.

In the fertile soil washed down into this valley from the granite heights above, open spaces may be planted with the native food-providing shrubs and trees, such as the alternate-leaved cornel, the wild pear that is so beautiful in its springtime flowering, the red-berried ilexes and richly fruiting thorns that bring such glowing color into the northern fall, interspersed with thick bushes suited for bird-nesting.

Here, too, there are excellent opportunities for growing along the banks of streams and ponds, near either entrance to this gorge, the seed-bearing herbaceous plants on which the marsh and water birds subsist, and an admirable chance for creating islands upon flooded marshlands which will form ideal breeding places for both land and water birds. Water in every form is here abundant—in springs and streams and open pools—while the deep, rich soil of the swamp and swale already produces plants in plenty to entice the birds that haunt such places, and little more is needed than to give these plants a chance to make their best development.

All through this valley and the adjoining one to the eastward, with its old beaver-pool beneath the wooded side of Newport Mountain, admirable opportunities may be found for such sheltered feeding places. Many more of the insect-eating song and other birds of New England farms and gardens which winter in the south might readily be led to make their summer home upon the island, while the great variety of northern winter birds which migrate through this region would make it possible, at little cost, to feed and assemble here large numbers of them also in many species.

A BIRD STUDY STATION IS NEEDED

And here, of all places, an admirable opportunity presents itself for the establishment of a bird study station, combined with bird protection, such as has proved so valuable in Germany and has revolutionized the methods formerly in use there for the encouragement and protection of bird life.

At such a station the best methods of bird protection, food supply, and propagation would be studied out and given practical trial, and from such a station the results obtained would be published widely for the benefit of the country, while the interest and practical importance of the work done would, when once the undertaking was established, bring people in number to the island in summer time to study the methods practiced, or the birds themselves attracted to the spot.

Work along this line is greatly needed in America, to whose bird life the results obtained in Germany have proved, on experiment, to be only partly applicable; and carried out at Mount Desert, where and to the adjoining coast and islands so strong a tide of summer travel sets each year, and where so many people of influence and education, drawn from the country over, spend their summers, such work would have exceptional value, apart from the place's natural opportunity.

Nor would the presence of people in the reservation tend to drive out the birds, provided they were not molested, but help rather in extending the interest in bird life and knowledge of the birds. Some of the wilder birds are even now learning to live in cities where they are protected, and many birds might easily be attracted to a region so favorable for their shelter, sustenance, and nesting as this.

Mount Desert Island lies in the midst of a great chain of lesser isles spread

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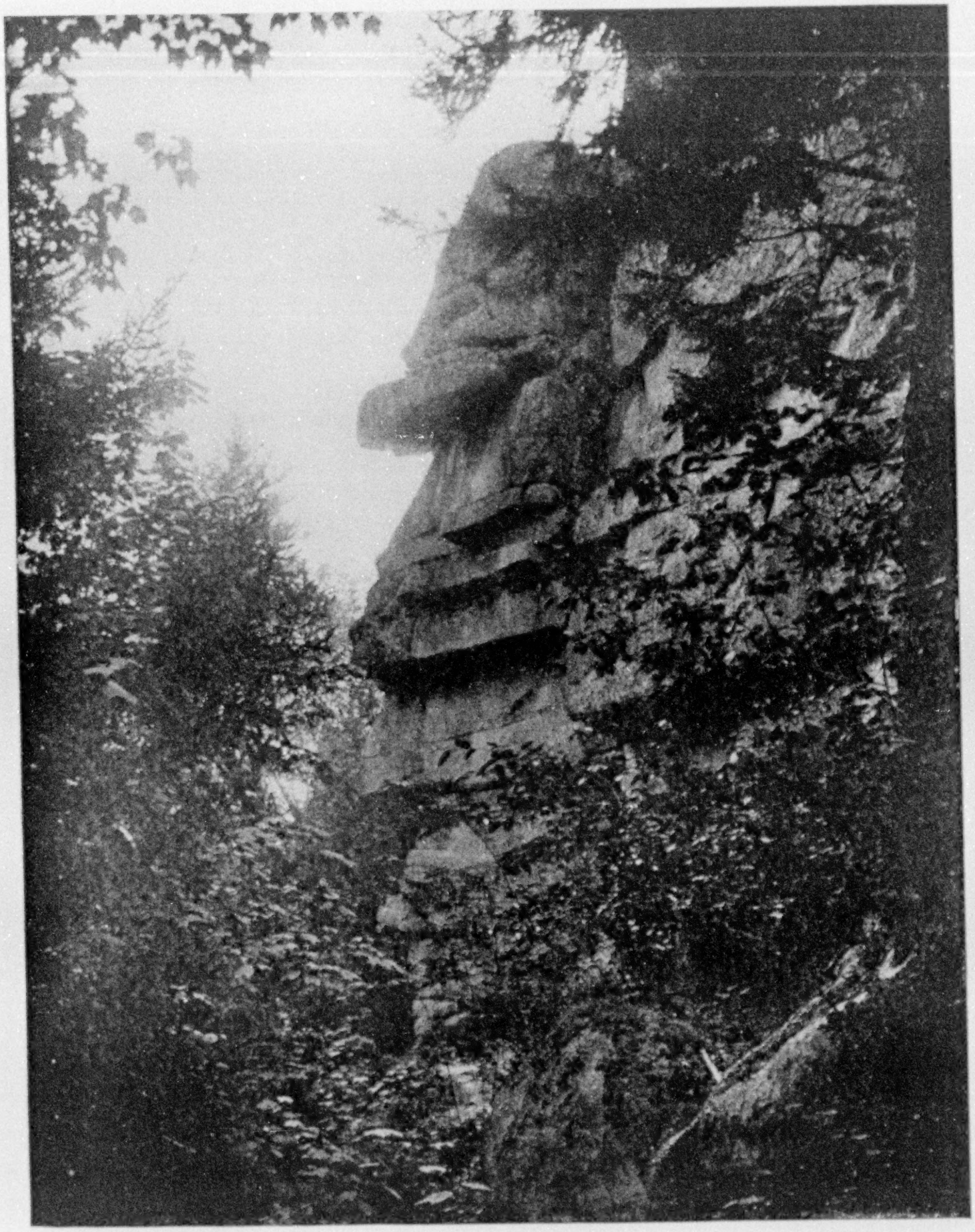

ON THE CADILLAC TRAIL ABOVE THE OCEAN DRIVE

An ancient sea-cliff cut by the beating surf of thousands, and probably tens of thousands, years ago, though now raised high above the ocean level by coastal uplift. The path along its base, named for the Sieur de Cadillac, one of the early French pioneers, is one of extraordinary picturesqueness.

broadly out along the coast on either side for 50 miles, and its dominating height and greater size make it doubly central. The establishment of the bird reservation now proposed upon this great coast landmark of the North Atlantic will mean not one important sanctuary only, but ultimately a far-reaching chain of island refuges along that coast — protected at little cost by local fishermen—where land as well as water birds may breed in safety.

Some of these islands already support considerable nesting colonies of terns in several species, of gulls, guillemots, petrels—"little Peters" walking on the water—herons, ospreys, with a few colonies of eider ducks and puffins. A few of these colonies, on islands lying to the seaward of Mount Desert, are now guarded by the Associated Audubon Societies, but speedy protection only can preserve the others from extinction.

The Mount Desert reservation, with its associated island sanctuaries, could not long remain an isolated work of bird protection on this great eastern highway of migration, but would form the first of a series of permanent bird refuges along the Atlantic coast of the United States which must eventually be established from Maine to Florida if the people of this country are to preserve what yet remains of the original bird fauna.

That some place in that region should be taken without delay for such a reservation cannot be questioned; and by accepting the important opportunity now offered on this island the Federal government would obtain immediately the best place possible for initiating a work long urgent on the Atlantic coast, and by whose neglect species of great economic value or exceptional beauty, like the passenger pigeon and the trumpeter swan, have been — hopelessly in the one case cited or practically in the other — but lately lost.

MOUNT DESERT CONTAINS A GREATER DIVERSITY OF PLANT LIFE THAN ANY SIMILAR RESTRICTED AREA IN NEW ENGLAND OR IN THE EASTERN STATES.

One of the commonest sights in the wilder districts of the northeastern United States is vast stretches of burned and waste lands, left in this sad condition after the cutting of timber and intentional or accidental burning of the refuse.

Now it so happens that nearly if not quite all the native plants which originally inhabited the forested areas have a peculiarly modified root structure which renders it impossible for them to grow in any soil but the moist and sponge-like forest humus (leaf-mold).

The first effect upon the native vegetation, then, of clearing and burning the forested areas is the complete annihilation of countless individuals, representing hundreds of species of wild flowers and ferns, which make much of the original charm of the primitive forest. So complete has been the destruction of the humus layer by the cutting and burning of lands through many generations that it is well-nigh impossible to find within 50 miles of our large towns any areas of appreciable extent where the original wild flowers of the forest can now be seen.

This calamity, as it is viewed by lovers of nature, does not stop, however, with the mere destruction of the native wild flowers and ferns; but, through the upsetting of nature's equilibrium, a much more serious situation is evolved. Very briefly, the process is this: The cutting of the forests, with its consequent drying out or burning away of the humus (leaf-mold), destroys, as already stated, the native forest vegetation; the destruction of the native plants has its immediate effect upon the feeding and breeding of the native insects, which nature has through countless ages made dependent upon them and which rarely if ever become troublesome to the farmer.

The destruction of the food-plants of the native insects, depleting or locally exterminating the native insect species, again has its effect upon the native birds, which through ages have depended upon the indigenous insects. The destruction of the native vegetation, furthermore, has a direct effect also upon the native birds and mammals, in that their natural breeding haunts and hunting grounds are destroyed.

Whether or not the gradual reforesta-

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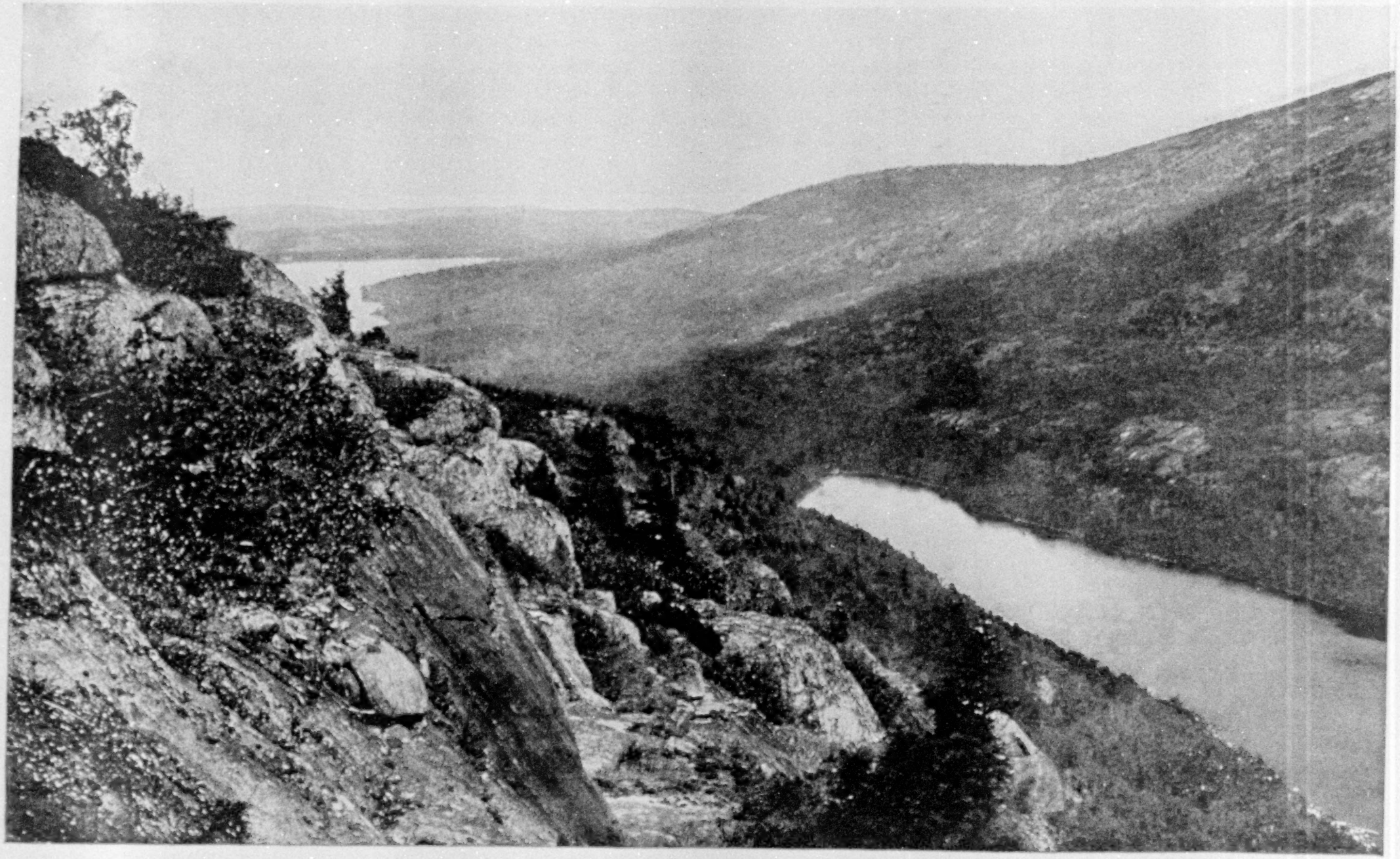


LOOKING DOWN FROM PEMETIC MOUNTAIN

A deep gorge plowed by the seaward flowing ice-sheet through the once solid granite mass whose boldly sculptured remnants form today the Mount Desert Mountains. The view is taken looking northward from the precipitous side of Pemetic Mountain. Eagle Lake, whence the water supply for Bar Harbor and the northern side of the island is chiefly drawn, shows in the distance.

tion of our burned or deforested areas will in the course of hundreds or thousands of years develop a sufficient humus carpet to support again the original forest flora and with it the forest fauna, it is of course impossible to say. It is, however, unfortunately apparent that, should that time ever come in the future history of our continent, the original native plants and animals will have become so depleted that the task of resettling future forests with indigenous life will be an impossible one.

It has, therefore, long seemed to the writer that the only way in which to conserve for the enjoyment and study of future generations any portions of our country which by good fortune are still somewhat in their natural condition is the reservation of all such tracts as may properly be set aside, with the explicit stipulation that they be left essentially in the hands of Nature herself to care for.

This brings me to the crucial point: where is the best spot, if only a single spot can be thus preserved, for the perfection of this ideal? A detailed knowledge of the geography; the flora, and to some extent the soil conditions of eastern North America, acquired through 25 years of active exploration in New England, the Maritime provinces, Quebec, Newfoundland, and Labrador, naturally brings several regions to mind; but as a single area within the possible reach of this hope, the Island of Mount Desert, with its adjacent islets and headlands, stands out as offering the greatest natural diversity.

This comes obviously from the fact that Mount Desert is the highest land on the Atlantic coast of North America south of the Gulf of St. Lawrence, its hills reaching altitudes of almost montane character.

The exposed headlands and bogs of the Mount Desert region support between two and three hundred species of plants which are typical of the arctic, subarctic, and Hudsonian regions of America, and which on the eastern coast of New England or the alpine summits of the White Mountains reach their actual or approximate southern limits—such plants, for instance, as the black crowberry (*Empetrum nigrum*), the baked-apple berry (*Rubus Chamæmorus*), the creeping juniper (*Juniperus horizontalis*), the Greenland sandwort (*Arenaria grœnlandica*), the rose-root (*Sedum roseum*), and the Banksian pine (*Pinus Banksiana*).

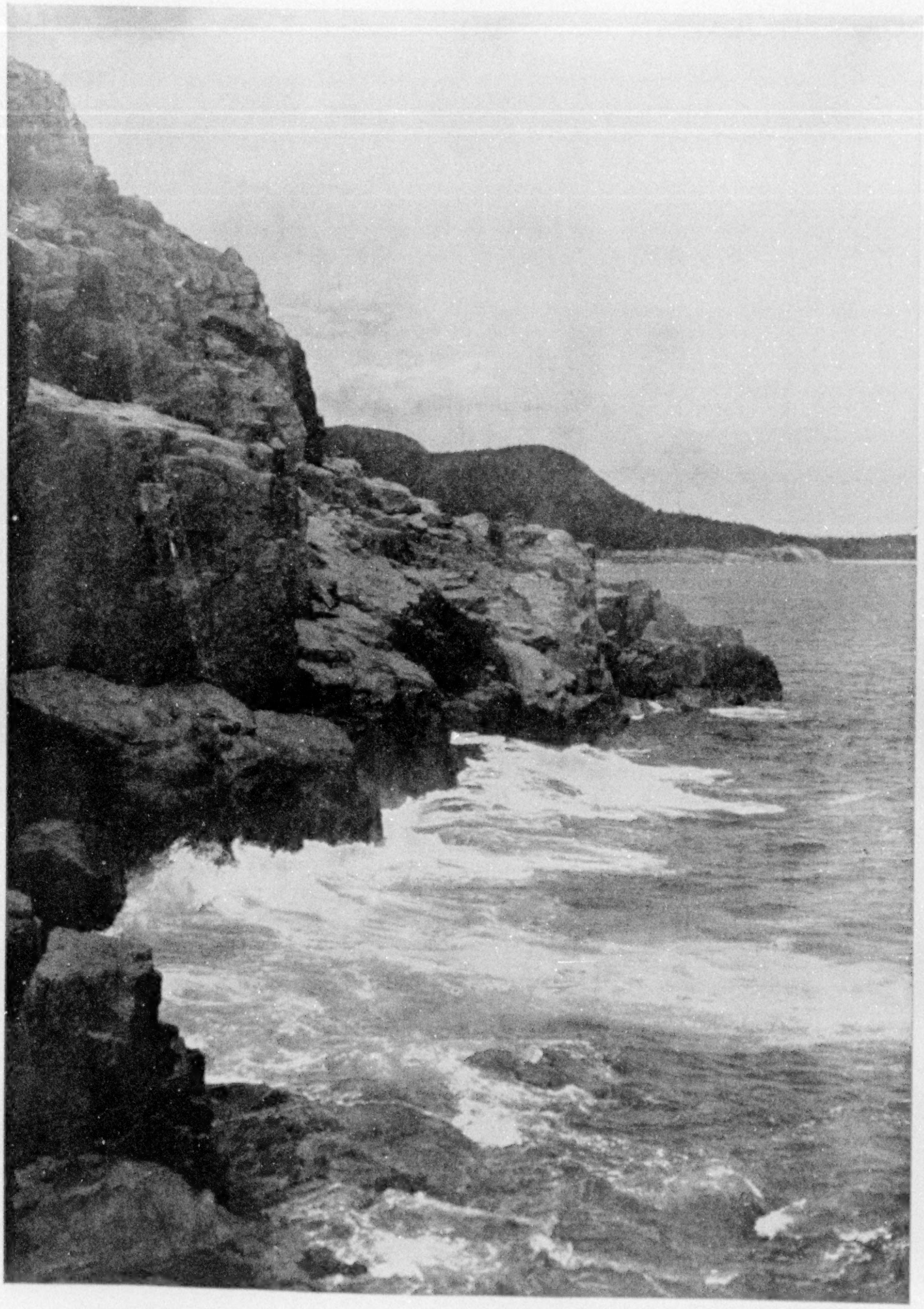
But the flora of the Mount Desert region is not by any means entirely arctic or subarctic. There we find essentially all the common plants of the Canadian Zone, and mingling with them in sheltered nooks or meadows or on warm slopes, many scores of plants which reach their extreme northern or northeastern limits on Mount Desert or the immediate coast—such plants as pitch pine (*Pinus rigida*), the bear oak (*Quercus ilicifolia*), the sweet pepperbush (*Clethra alnifolia*), the swamp loosestrife (*Decodon verticellatus*), the meadow beauty (*Rhexia virginica*), and the maple-leaved viburnum (*Viburnum acerifolium*).

This extraordinary accumulation within one small area of the typical plants of the arctic realm, of the Canadian Zone, and in many cases of the southern coastal plain, cannot be duplicated at any point known to the writer.

In its rock and soil composition Mount Desert offers a most attractive possibility. Much of the island consists of granitic rocks, with their consequent acid soils; but the soils derived from some of the metamorphic series, slates and shales, are, judging from the native vegetation, of a basic or even limy character, and many of the swamps are covered not with the heath thickets of acid bogs, but with the characteristic grasses and sedges of sweet areas.

Several plants of the island, sometimes of rock habitats, sometimes of swamps, suggest themselves at once as species, which in their wide range show a strong preference for sweet or limy habitats: the shrubby cinquefoil (*Potentilla fruticosa*), the showy lady's slipper (*Cypripedium hirsatum*), the hemlock parsley (*Conioselinum chinense*), etc.

These features are sufficient, it would seem, to indicate the remarkable possibilities for the future if a tract like Mount Desert can be preserved from the destruction of its natural charms by the judicious guarding of what it now possesses and the re-introduction of what it



OTTER CLIFFS

A splendid granite headland split into huge, titanic blocks by the northern winter's frost and exposed to the unbroken sweep of ocean storms. The famous ocean drive skirts the rocky shore beyond, and the sand beach, which lies between it and Great Head, shows in the distance on the right.

has lost, or presumably lost, both plants and animals.

The location of the island as the playground, habitual or occasional, of a vast and highly intelligent portion of our population also renders it remarkably appropriate for such a natural reservation; and if such a reservation could be established with emphasis laid upon the redevelopment and maintenance of natural and indigenous conditions, its influence upon the intelligent peoples of America would be far-reaching; for it is inconceivable that lovers of nature could enjoy such an ideal area, with its unmolested wild flowers, ferns, birds, and mammals, and with the full beauty of nature everywhere displayed, without desiring and providing a similar blessing—according to the varied opportunities that offer—for themselves and their children in other parts of the nation.

It is therefore earnestly hoped that those who have it within their power will take the proper steps to insure the preservation and true conservation of the area so generously placed at their disposal.

A BOOK OF MONSTERS

By David and Marian Fairchild

One year ago the Geographic *printed a series of remarkable photographs of "Monsters of Our Back Yards," by David Fairchild. The series of pictures and the article accompanying them aroused so much comment and stimulated such an interest in the study of these important but tiny creatures that the National Geographic Society urged Mr. Fairchild to photograph more of these monsters. This he has done, and seven additional photographic enlargements are printed here. For the benefit of those readers who are particularly interested in the subject, the Society has arranged for the publication, in book form, of more than a hundred of Mr. Fairchild's pictures of spiders, hornets, wasps, ants, bees, bumblebees, red and black ants, grasshoppers, locusts, cricket-on-the-hearth, cockroach, dragonflies, squash-bug, lantern fly, crane fly, insect hawks, soldier termite, mosquitoes, butterflies and their larvæ, moths, caterpillars, June-bug, ground beetle, clover-leaf weevil, blister beetle, cucumber beetle, scarab, etc., etc.*

Each creature photographed is magnified so many times that few details of the external anatomy escape observation; and as one closely examines the pictures, which sound a new note in the layman's study of nature, he is at once interested and amazed at the new world it discloses and cannot help a curious fascination in learning, for instance, of the existence of the delicate antennæ which enable the cockroach to feel danger before it is seen, or of the wing-piece music-box with which the male cricket calls to its mate in the grass, and other strange and wonderful mechanisms of nature which stand out under the powerful microscope.

The authors tell the life story of each "monster" they present with a fidelity to fact that satisfies the scientist, and at the same time they have invested each "biography" with a charming touch of human interest which takes the reader off into the wonderland of his dooryard and gives an introduction to a new world second only in importance to our own, when measured by the vast effect it has upon human affairs.

The book should be in the hands of every child and adult who would know the wonder world which touches us on every side. As only a limited edition has been printed, those desiring copies should send in their reservations at once on the blank form printed elsewhere in the Magazine.

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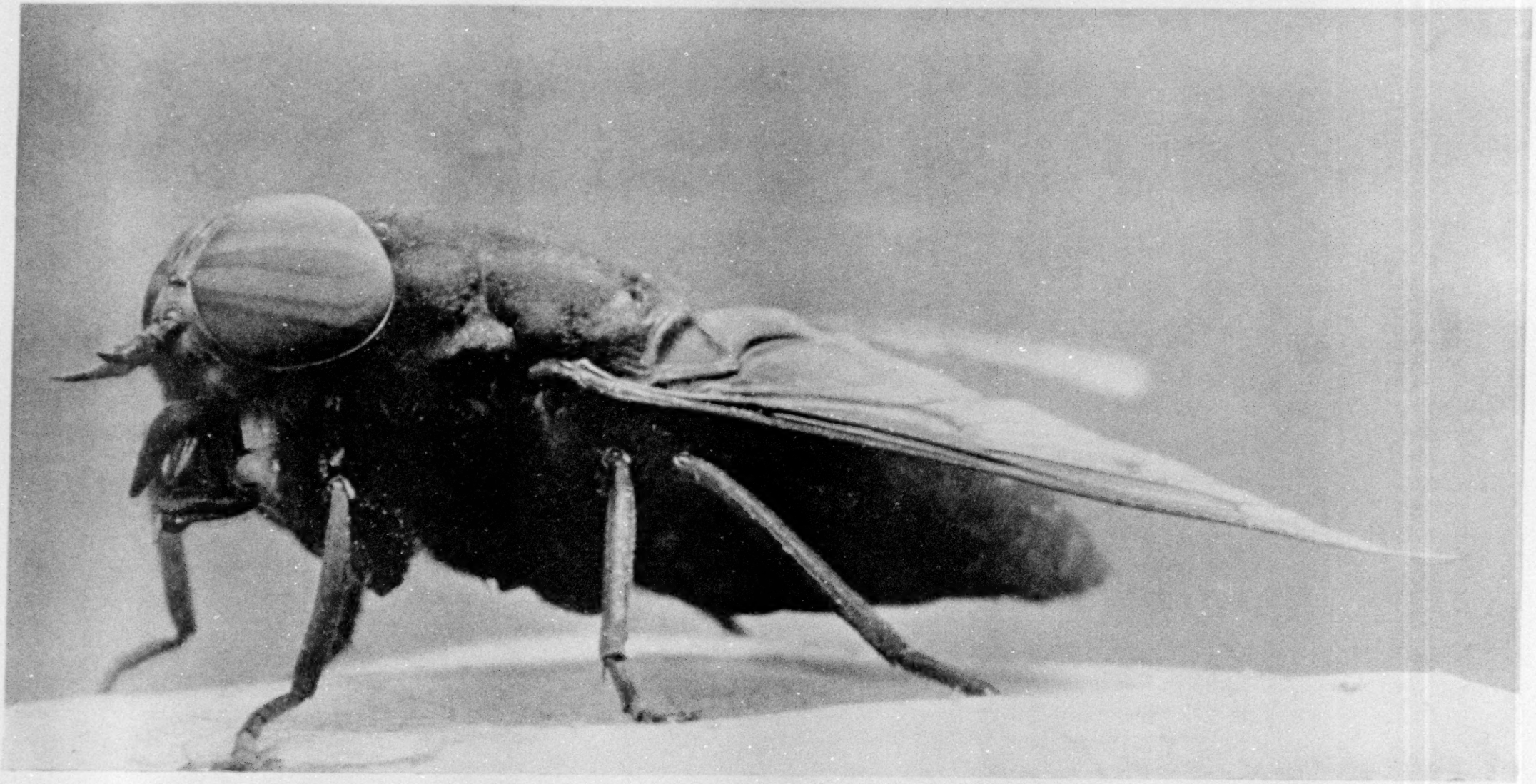

©

GREEN-HEADED HORSEFLY (*Tabenus punctifer*)

There are nearly two hundred species of horseflies in North America, and this creature represents one of the commonest forms. The bands of iridescent green and copper and purple across its enormous eyes make it a beautiful creature to look upon. We never used to think the bite of flies was anything worse than annoying; but recently, since we have discovered the danger of letting the germs of disease into the blood streams of our bodies, we have come to see the ghastly possibilities which lie in the piercing mouthparts of these flies. They suck the blood of animals whose blood streams may be swarming with disease germs, and then fly directly to our houses and puncture our skins with a beak covered with these germs, which slip off into our veins. Until we know that the diseases of the birds and field mice, the coons and 'possums, and all other warm-blooded beasts of a locality are harmless to us, or that it is impossible to transmit them to human beings, it is best to look upon these blood-sucking creatures as winged hypodermic syringes laden with disease. Photo and note by David and Marian Fairchild.

THE pictures of monsters are portraits of creatures which are as much the real inhabitants of the world as we are, and have all the rights of ownership that we have; but, because their own struggle for existence so often crosses ours, many of them are our enemies. Indeed, man's own real struggle for the supremacy of the world is his struggle to control these tiny monsters.

The plague of the Middle Ages, which spread like some mysterious supernatural curse over Europe and carried off millions of people, the yellow fever that has haunted the coasts of South America, the malaria which has strewn the tropics of the world with millions of graves, have been caused by the activities of two monsters so universally present in our homes as to have become almost domesticated creatures—the flea and the mosquito. During these last two decades these have come under our control, and the flies which leave a colony of germs at every footstep will not much longer be tolerated; indeed, every creature that bites and sucks our blood or that crawls over our food and dishes has been placed under suspicion.

Man struggles against these tiny monsters not only for his life and health, but for his food as well. Almost every cultivated plant has its enemy, and some of them have many. The bugs alone, which stick their beaks into all sorts of plants to suck their juices, would starve man out in one or two brief seasons if they in turn were not held in check by enemies of their own. The chinch-bug alone has demonstrated its power to devastate the wheat fields. The bark-beetles that girdle square miles of forest trees, the moths that destroy their foliage, the creatures that burrow into the fruit and fruit trees, the gall-forming flies that form galls on the roots of the grape-vines, able to destroy the revenues of a whole country, the beetle which strips the potato of its leaves, the one which infects with its dirty jaws the melon vines of the South and turns the melon patches brown—these are a few of the vast array of our enemies It would require a book much larger than this one just to enumerate those well known.

It should make every American proud to know that it is the American economic entomologist who has, more than any other, pushed his way into this field and shown mankind how to fight these monsters which destroy his food, his animals, and himself.

But all these fascinating little creatures are not our enemies. We must not forget that man has domesticated certain of the insects, and that gigantic industries depend upon them for their existence.

The honey-bee furnished mankind with sweets during the generations preceding the discovery of the sugar-cane, and the silk-worm furnishes still the most costly raiment with which we clothe ourselves.

The friends we have in the insect world are those which destroy the pests of our cultivated crops, like the Australian lady-bird beetle, which has been sent from one country to the other to keep in check the fluted scale which is so injurious to the orange orchards, and the parasites of the gipsy-moth, which in Europe helps to keep under control this plague of our forest trees, must certainly be counted as our friends.*

Also they are our friends if, like the spiders, they kill such monsters as suck our blood or make our lives unsafe, or, like the great hordes of wasps and hornets, wage unending warfare against the flies, but which, because they attack us personally if we come too near their nests, we kill on sight. Strangely enough, it is often these same stinging insects which help us by fertilizing the blossoms of our fruit trees. Indeed, many plants are so dependent on these little creatures that they have lost the power of self-fertilizing, and thousands of species of trees and plants would become extinct in a generation without their friendly aid.

The ancestors of some of the creatures pictured in "The Book of Monsters" were buried in the transparent amber of the Baltic many thousands of years ago, and the fossil remains of others date back a million years or more; but while man has been developing his surroundings from the primitive ones of savagery

* See article by Dr. L. O. Howard, entitled "Explorers of a New Kind," printed on pages 38-67 of this Magazine.

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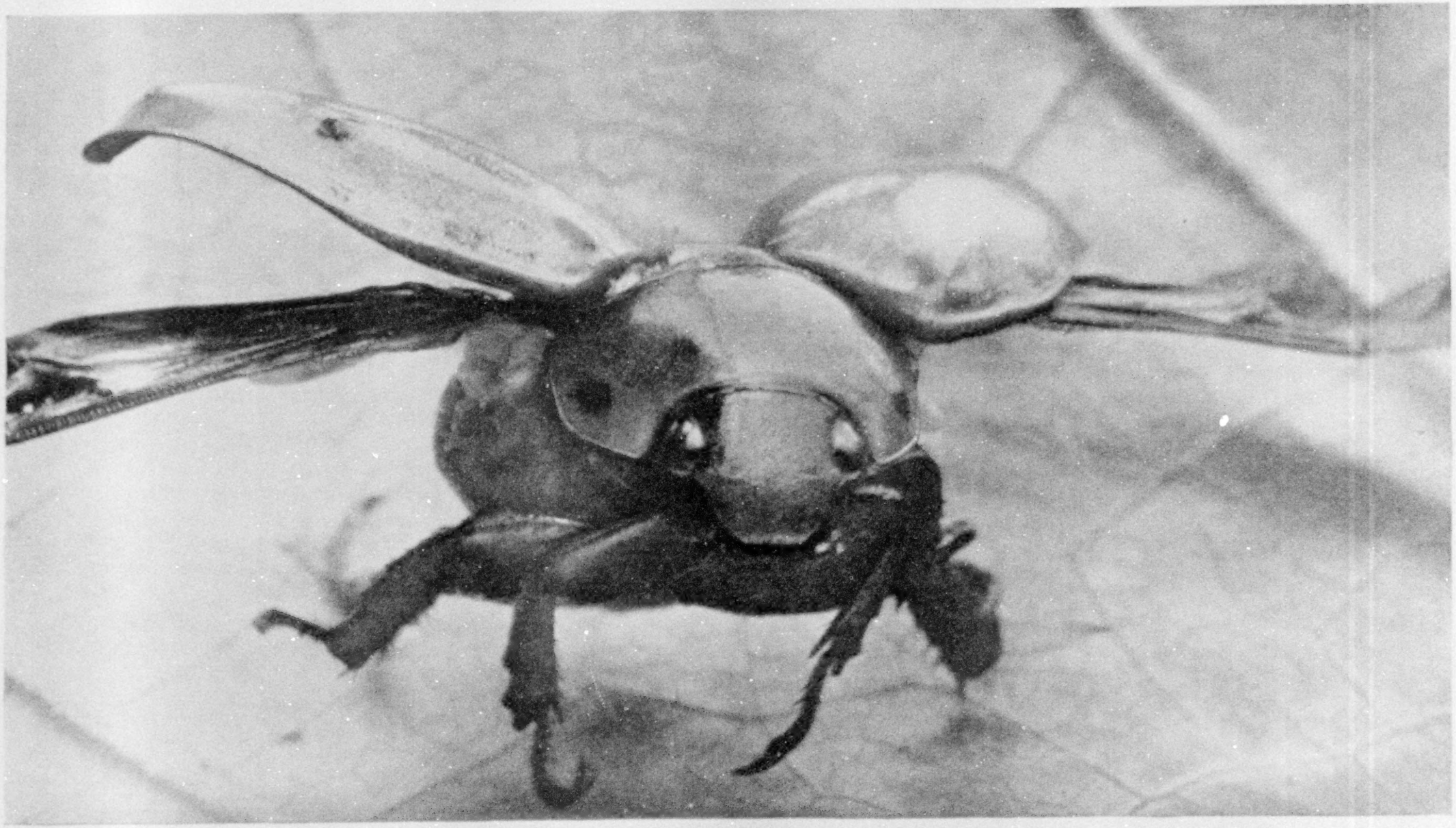

© THE ARMORED KNIGHT: THE SPOTTED VINE CHAFER (*Pelidnota punctata*)

How often one sees lame butterflies limping along in their flight because their wings have been injured by the rose bushes or by striking against the pine needles, or have been nipped by some hungry bird. The beetles, when they alight, fold up carefully each delicate wing, close down over them polished covers as hard almost as steel and fitting as closely as the engine covers of an automobile. When one thinks that man has just begun to fly, whereas the beetles flew perhaps a hundred million years or more ago, these wings and their most perfect chitinized wing covers are deserving of our wonder and of our admiration, too. Photo and note by David and Marian Fairchild.

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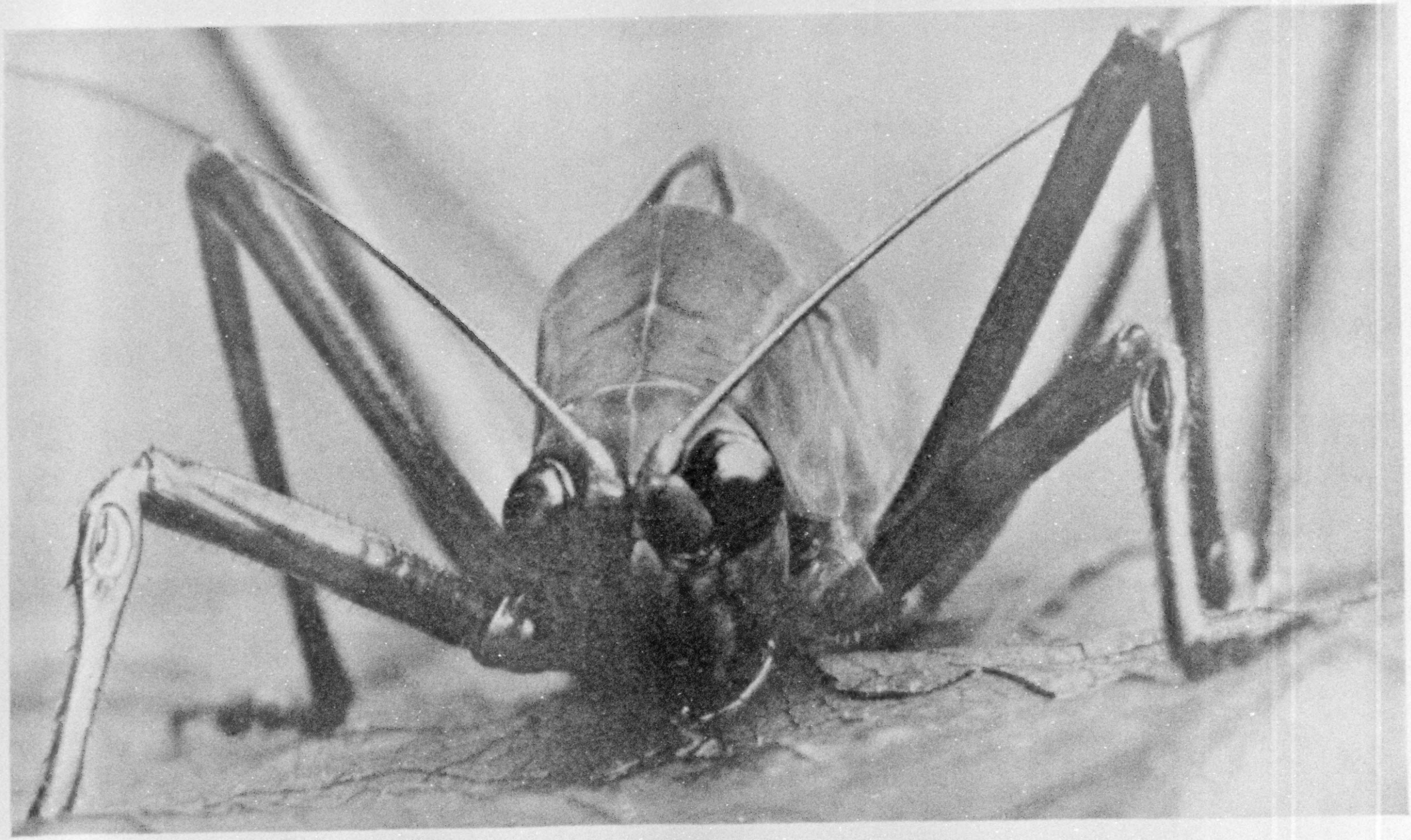
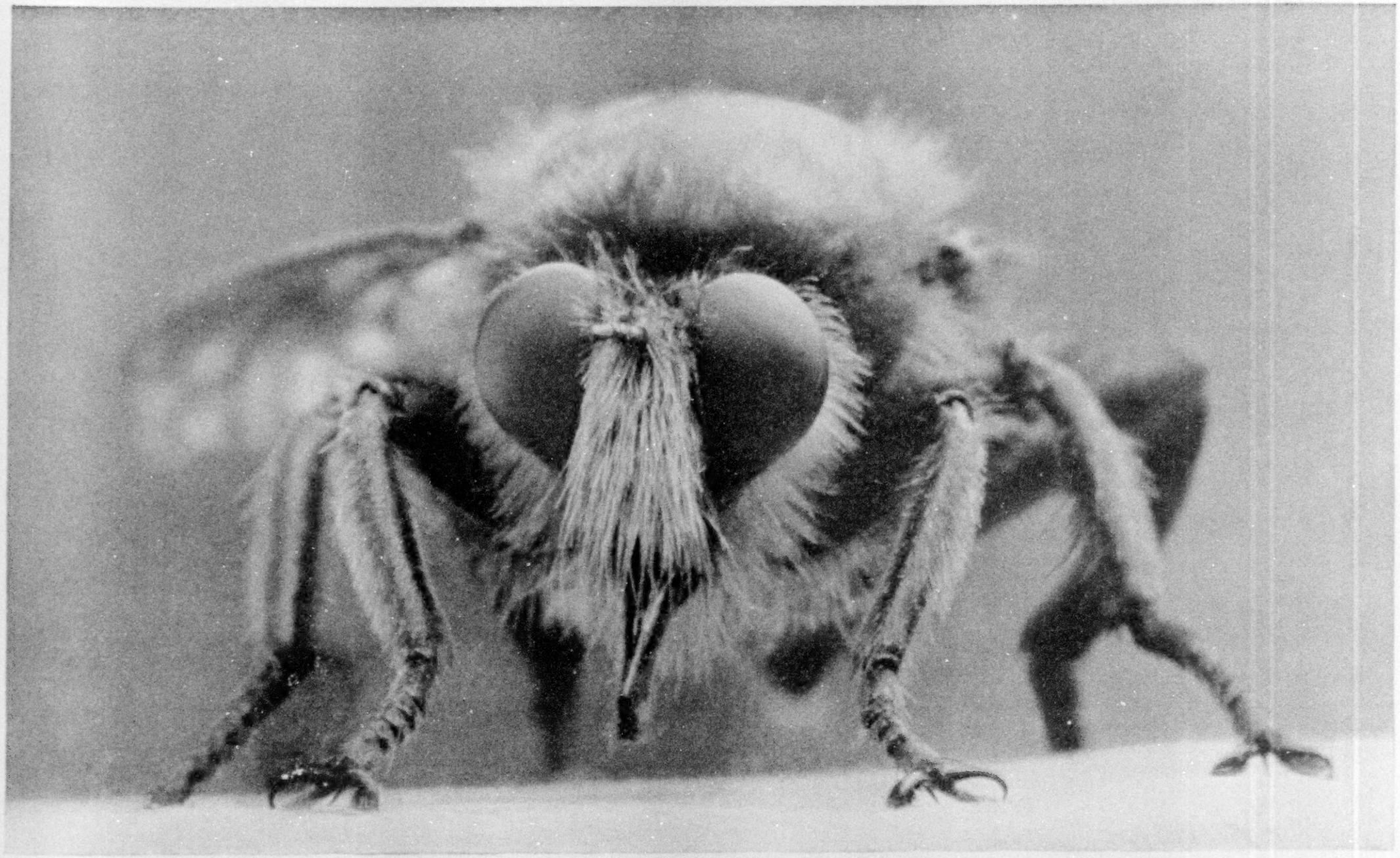


© THE KATYDID (*Scudderia*)

How marvelously equipped such a creature as this is to live! The great eyes, with many facets, enable it to see by night as well as by day. Its long, slender antennæ catch the faintest odor, and probably are sensitive to a host of perfumes that we do not know. In the front of each fore leg, just below the knee, is a dark, sunken area—the ear—with which it can probably hear sounds too faint for our ears, and by moving them can tell from which direction the sounds come. Its long muscular legs enable it to jump great distances, and its wings not only enable it to fly well, but in the males are provided with an apparatus near their base for making a musical sound. This sound is made by half opening the long green wings and closing them again rapidly. While the wings are opening no sound is produced; as they close the characteristic sounds so like the words "Katy did" are made. Photo and note by David and Marian Fairchild.



© ONE OF THE ROBBER FLIES (*Dasyllis grossa*)

When I learned that this powerfully winged, hairy fly tears beetles' wings from off their backs with that wedge-shaped beak of hers and sucks the blood of bees and wasps, it gave me a different idea of the great fly family, which hitherto I had thought was made up of defenseless creatures like the house-fly. Of all the insects we have photographed, few have seemed to be more thoroughly fearless or more ugly than the robber flies. Photo and note by David and Marian Fairchild.

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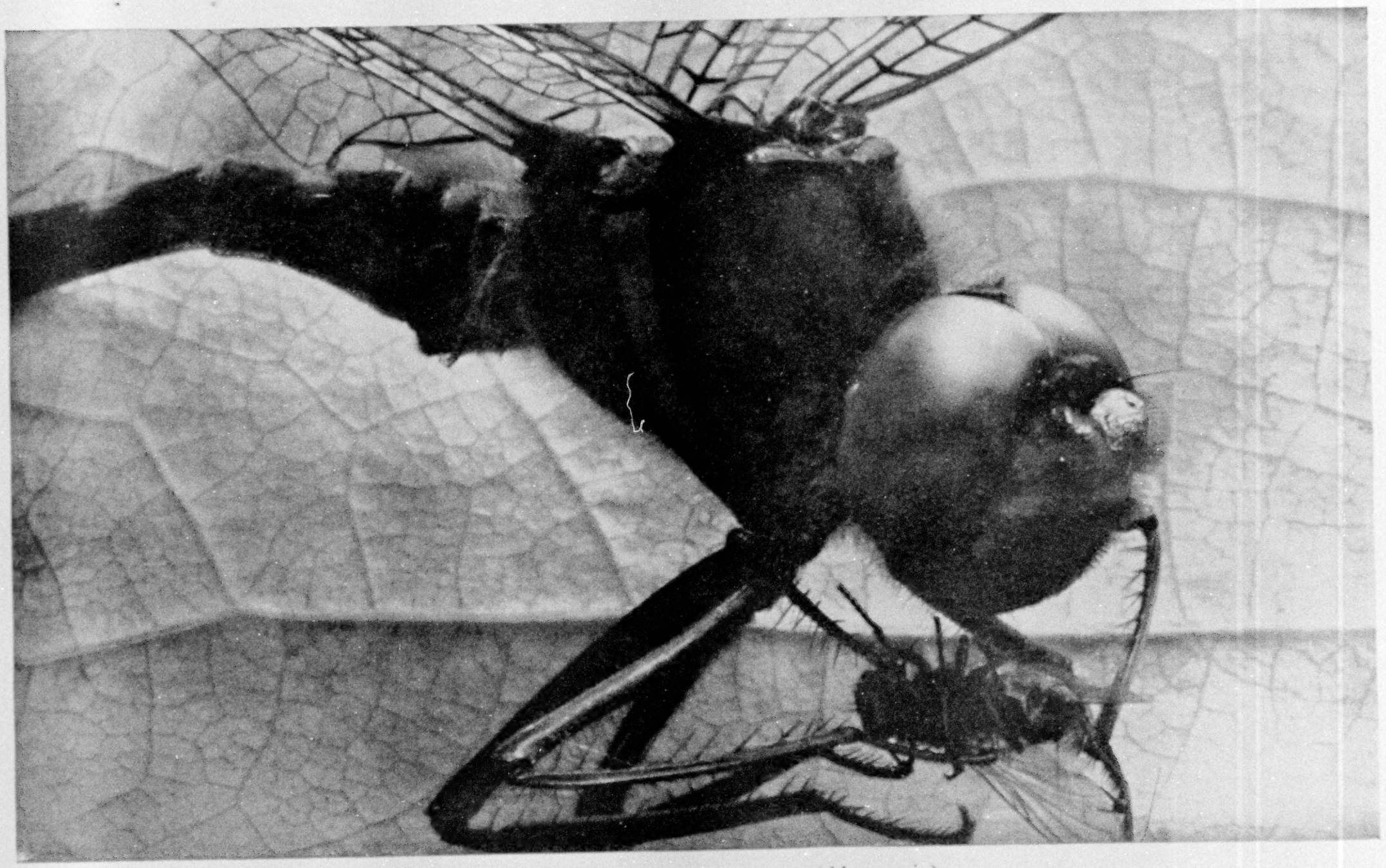
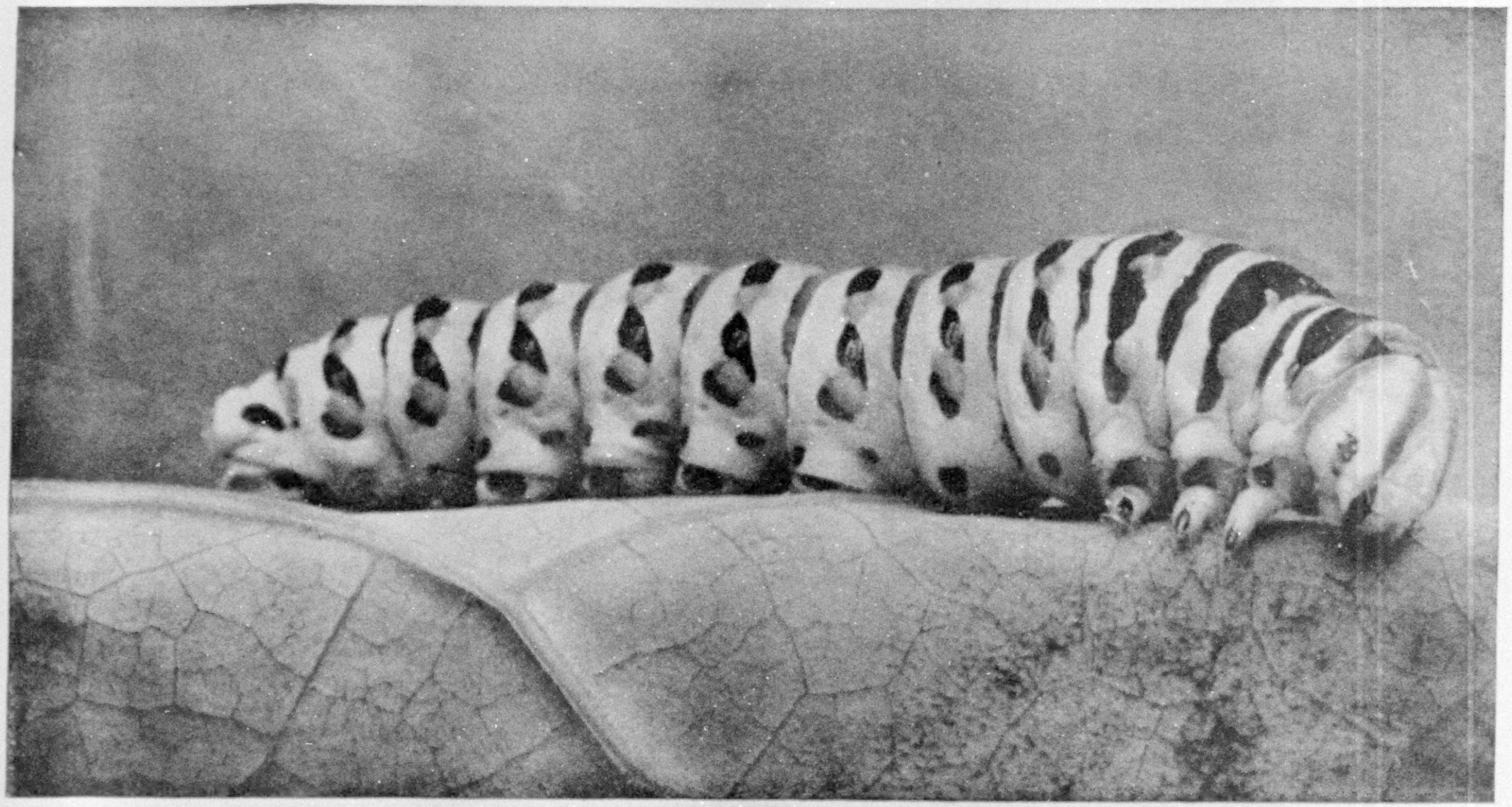


© THE DRAGON-FLY AND ITS VICTIM (*Macromia*)

When I caught the dragon-fly whose picture is shown here, I held it by the wings, and, catching a fly that buzzed about the table, dropped it in its claws. Without a moment's hesitation its mouth opened wide and closed upon the fly. I watched it disappear underneath its great upper lip and almost fancied I could hear its shell crack as the powerful jaws and lower lips turned it around and around in the mouth. A few seconds only and the sucking throat had drawn out all the blood, and the lips threw out a ball-like mass made up of the fly's wings, legs, and crushed body skeleton. Then it opened again for more. One entomologist has said that in two hours a dragon-fly will eat at least forty house-flies, and Doctor Howard says that, if starved for food, it will eat up its own body. Perhaps some one will find a way to domesticate this creature and make it live upon the house-flies around the house. As a first step, Needham has fed the larvæ on bits of meat. Sharpe, the British authority, has observed a dragon-fly returning again and again to the same bush, and Westwood believes he saw the same individual hawking for several weeks together over the same small pond. Photo and note by David and Marian Fairchild.



© NOT GOOD TO EAT

Have you never wondered at the temerity with which certain of these slow-moving, helpless creatures expose themselves to the attacks of their enemies? In a world so full of hungry, winged beings it does seem strange; and when the markings are black and white, or some such striking color in contrast with the leaves or bark, the temerity seems even more extraordinary, until one learns the simple fact—these creatures are not good to eat. What a protection! It would seem to rival the sting of the bumblebee, the poison fangs of the spider, or the venom of the centipede in its efficacy as a protective weapon. Not good enough to eat! Supposing that the fly and the mosquito were equipped with some flavor distasteful to the insectivorous birds, if cattle were not good to eat, nor sheep, nor hogs, nor any living, breathing things; what a change there would be in a world like ours! And yet to chemists there is very little difference between some compounds that are good to eat and others that are deadly poison, no greater than that between the poison bitter almond and the sweet one of our dinner table. "Not good enough to eat" is written on this creature's back in black and white so plainly that any bird with any sense or any past experience will pass it by untouched, not even pecking at it. Photo and note by David and Marian Fairchild.

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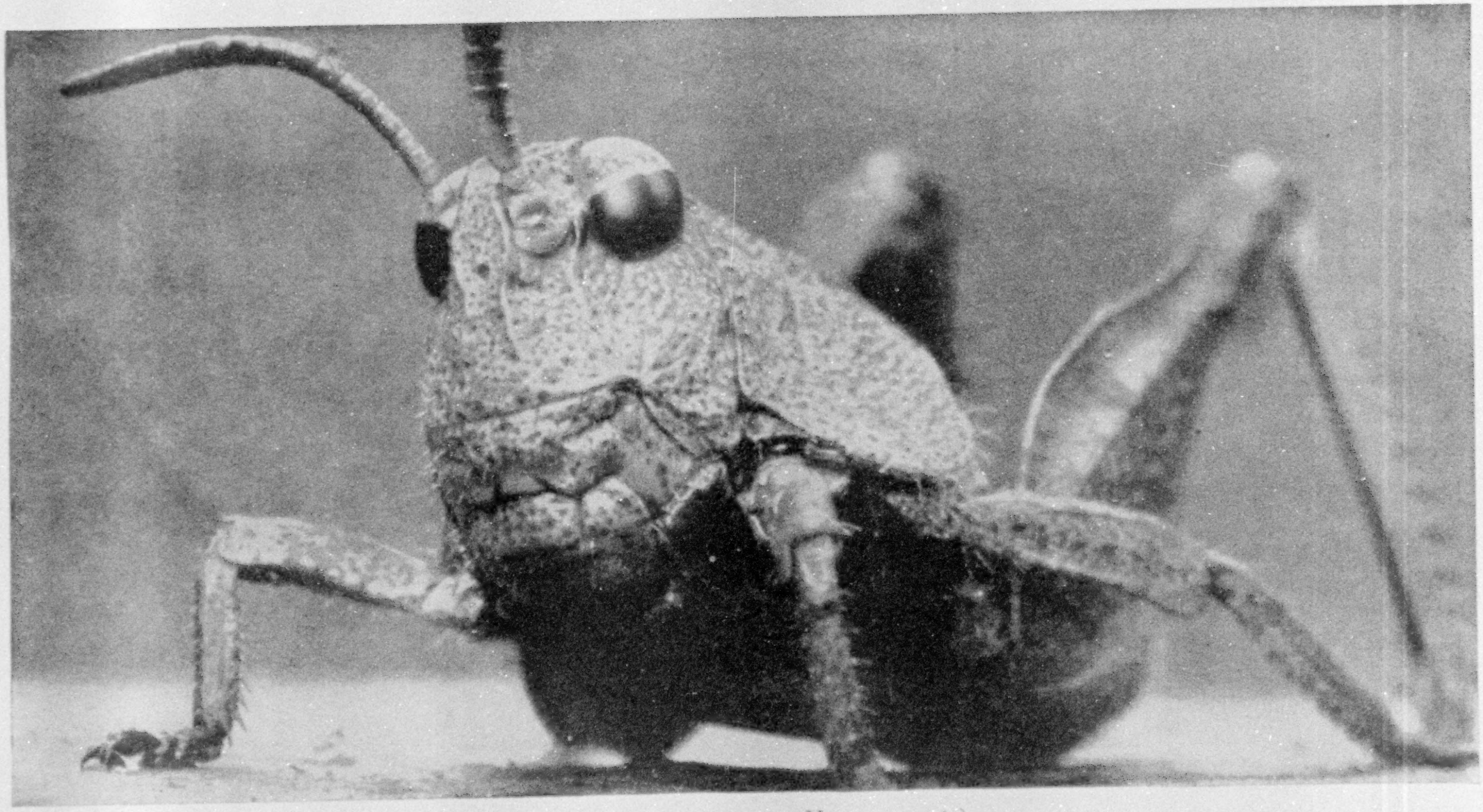

THE KING GRASSHOPPER (*Hippiscus, sp.*)

©

This young king grasshopper is probably twenty days old and its wings have not developed, but it can jump a hundred times its length, whereas man can scarcely cover three times his length at a leap. When its wings grow and its internal air sacs fill with air it can sail away for miles. One species of this great family can sail for a thousand miles before the wind, and they go in such numbers that they make a cloud 2,000 square miles in extent. Its great front lip hides a pair of jaws as effective as a hay-chopper, and it has an appetite as voracious as that of a hippopotamus. This voraciousness and these jaws are what have made several of its relatives the plague of mankind. They multiply in such numbers as to baffle all calculation, and every living green thing for thousands of square miles disappears down their throats, leaving the country they infest desolate. The great famine of Egypt, mentioned in the book of Exodus; the grasshopper years of Kansas, which ruined thousands of families on our plains, and more recent devastations in Argentina and South Africa are examples of the tremendous effects which the migratory locusts have had upon the happiness of mankind. As this young king grasshopper stands looking so inquiringly at one with his varicolored eyes, each of which is composed of hundreds of facets, I cannot help thinking that he represents a creature quite as fascinating and actually more dangerous than the East African monsters of our school geographies. It is hard to understand why he should live only a single season, crowding the experiences of a lifetime into a few brief months. Photo and note by David and Marian Fairchild.

to the almost inconceivably complicated ones of civilized life, these creatures, most of them at least, seem to be leading essentially the same kind of lives that they led hundreds of thousands of years ago.

They have powers which neither man nor any other mammal ever dreamed of having.

Some have powers of flight which enable them to sail a thousand miles before the wind. Others can jump a hundred times their own length. One of these monsters can manufacture a liquid rope as easily as mammals produce milk, and with it weave aërial nets to trap their pray, or by attaching it can drop from the dizziest heights without danger, and when the rope has served its purpose they eat it up.

Their weapons of defense are comparable to the deadly ones that only poisonous serpents have. If they were larger they would be in fact what legend pictures the dragons to have been.

The unthinkably old germ plasm of these species produces creatures which act with a precision of purpose and a degree of absolute self-sacrifice which cannot fail to stagger the most conscientious of the human race. They might even make one wonder whether the fulfillment of biological life does not consist in sacrifice of the individual for the good of the species to which it belongs.

Certain it is that human thought is now drifting away from the consideration of the individual and is coming to pay more attention to the species and the things which affect its development. This is a picture-book produced in the playtime hours of two busy people. It is a collection of actual photographs of a few of the small-sized monsters which inhabit the tall grass, the flower garden and vegetable garden, the pines and oaks of a place in the woods of Maryland.

If it should show to others a world of new and fascinating things it would be simply doing for them what the taking of the photographs has done for us—opened the door into a realm of real life, of a terrible struggle to live, which is as full of fascination as the dragon tales of old Japan. At the same time it makes us realize what vast and yet untouched fields of material value lie in the efforts man is making to outwit and circumvent, and even perhaps to exterminate, such of the monsters as encroach upon his own environment.

If you compare these photographs with those to be found in most books on insects you will find that they differ in several particulars. They are all either front views or side views of the creatures, whereas those in books on entomology are generally views from above. Imagine a book on the horse in which only top views were shown, or a guide to a zoölogical garden illustrated with the various wild beasts photographed from above. It is true that, being so much larger, we generally look down at these monsters; but a mouse also generally runs along the floor or under our feet, and yet a zoölogist pictures it from the same point of view that he does an elephant. Crows look down upon us, yet I imagine that no one will admit that the crow's impression of human beings is as correct or as interesting as that which we have of ourselves. Every creature has a right to be portrayed from its own level, and the reason these photographs are unusual is because they carry out this principle and do each creature justice.

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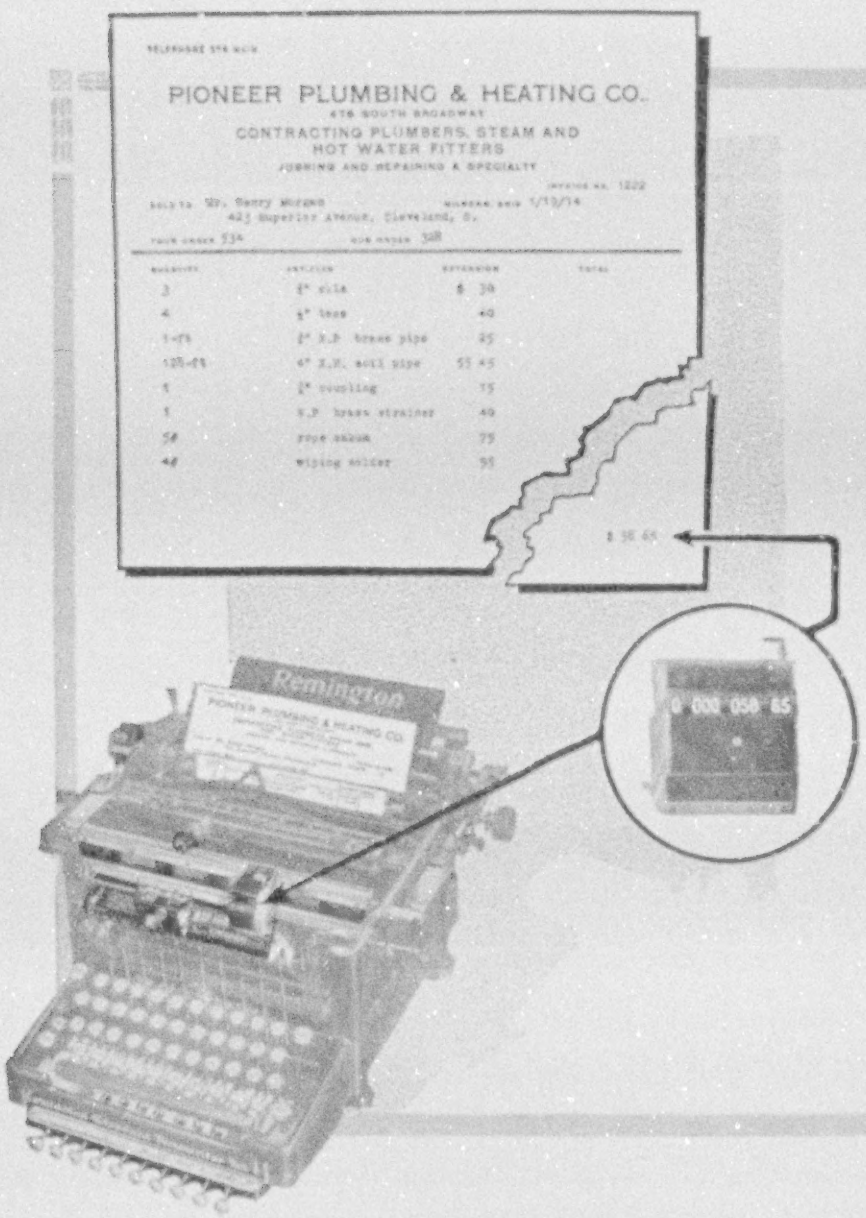

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For clear, clean typewriter results, use Remico brand letter paper,

"Mention the Geographic—It identifies you."

many times the price stage-coach methods.

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Your present typewriter would quickly type this bill—up to the torn-off point. Then comes a delay.

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The Remington Adding and Subtracting Typewriter—a complete correspondence typewriter—cuts out this time-waste. It *types*, *totals* and *proves* simultaneously. It dispatches bills and statements with through-express speed. It proves instantly.

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If you want to know how you can use this machine to relieve high-paid help of the drudgery of adding—how you can save valuable clerk-time, whether your business is large or small—how you can insure correct footings on every bill you send out—write for illustrated folder, "The Story of a Day's Work."

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the snow-white disappearing cream which gently

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Unscented—does not check perspiration—cannot harm the skin or stain the clothes.
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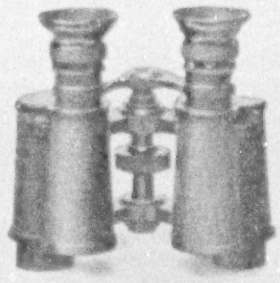
no longer forego the privilege of owning Prism Binoculars because of the high price.



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possess every advantage of $40.00 glasses and the price is just **$25.**

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Clean-cut Image
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Rigid Frame
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For Outing, Hunting, Racing, Sports, Technical Work

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Have No Competitors at **$25**

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723 Sansom Street Philadelphia, Pa.

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Try this experiment—rub a few drops of 3-in-One into your razor strop until the leather becomes soft and pliable; draw razor blade between thumb and finger moistened with 3-in-One; then strop. Every razor edge has teeth like a cross-cut saw; soap and water cause these teeth to rust; the more rust the duller the razor. Stropping only breaks off the microscopic rust particles, giving a new cutting edge which immediately commences to rust again. Now 3-in-One on the strop brings out the grain of the leather. This adheres to and wipes out the saw edges—leaving the cutting edge keen and clean. 3-in-One prevents even slightest further rusting.

FREE Scientific circular and sample bottle—both free.

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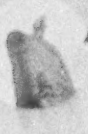

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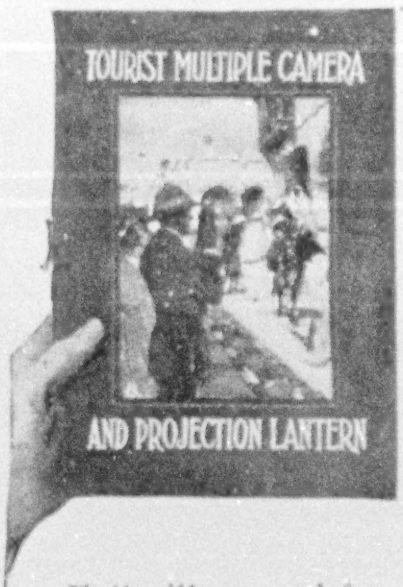

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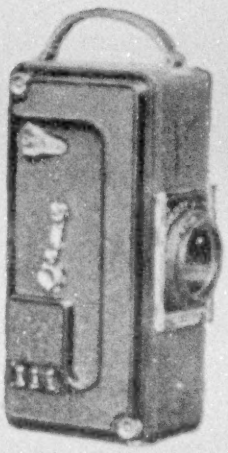

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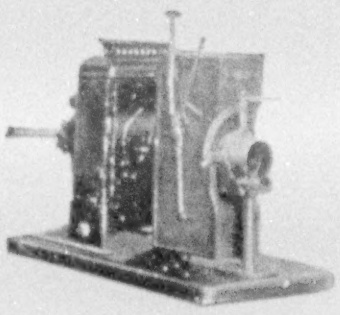
THE LANTERN projects the pictures, many feet in size, on the screen, step by step, by means of individual minature lantern slides made on a positive film from the original negative taken with the camera.

It is light, compact, and simple to operate.

You will find this catalog intensely interesting. Write today for your copy!



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Scene near Boston, Mass. Gypsy Moths stripped trees at right. Tree Tanglefoot protected those at left.

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Tree Tanglefoot is superior to anything on the market—it is better than grafting wax. It will waterproof the crotch of a tree or a cavity or wound in a tree where nothing else will do it.

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1-lb. cans	$ .30
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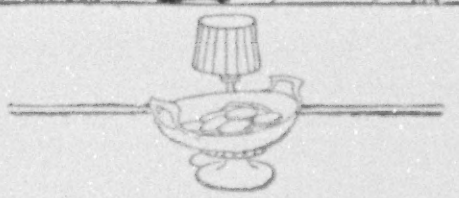

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Never an occasion of dining, whether the feast be simple or elaborate, when these delightful confections will not enjoyably "fit in."

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Almost any well-appointed confectioner carries them.

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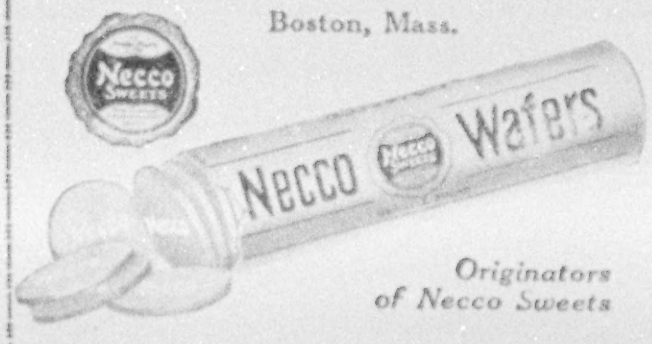

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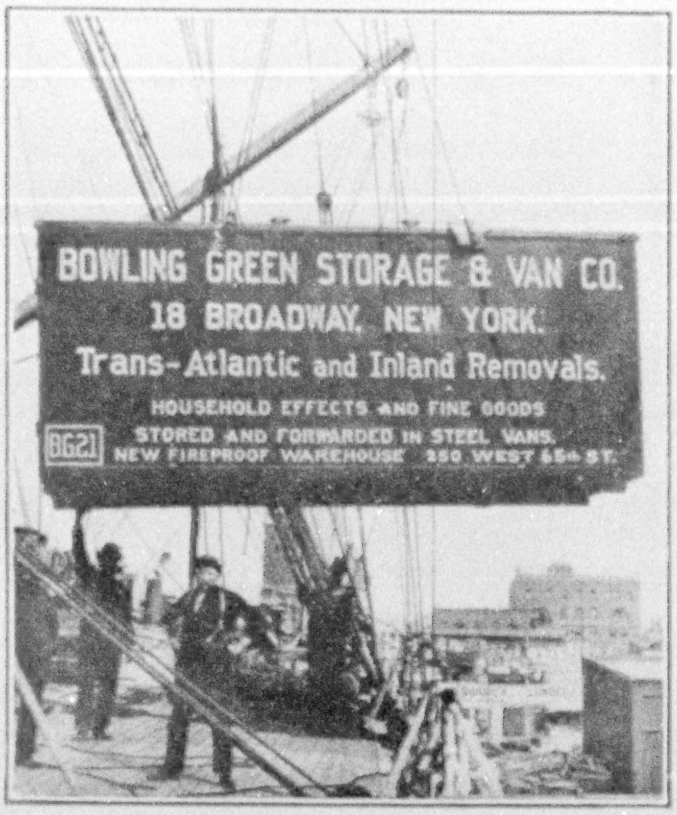

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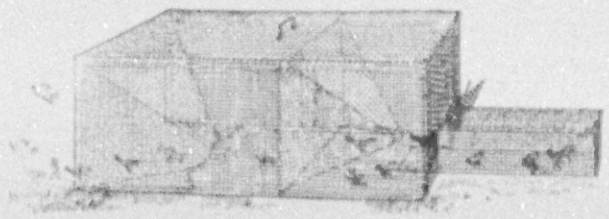

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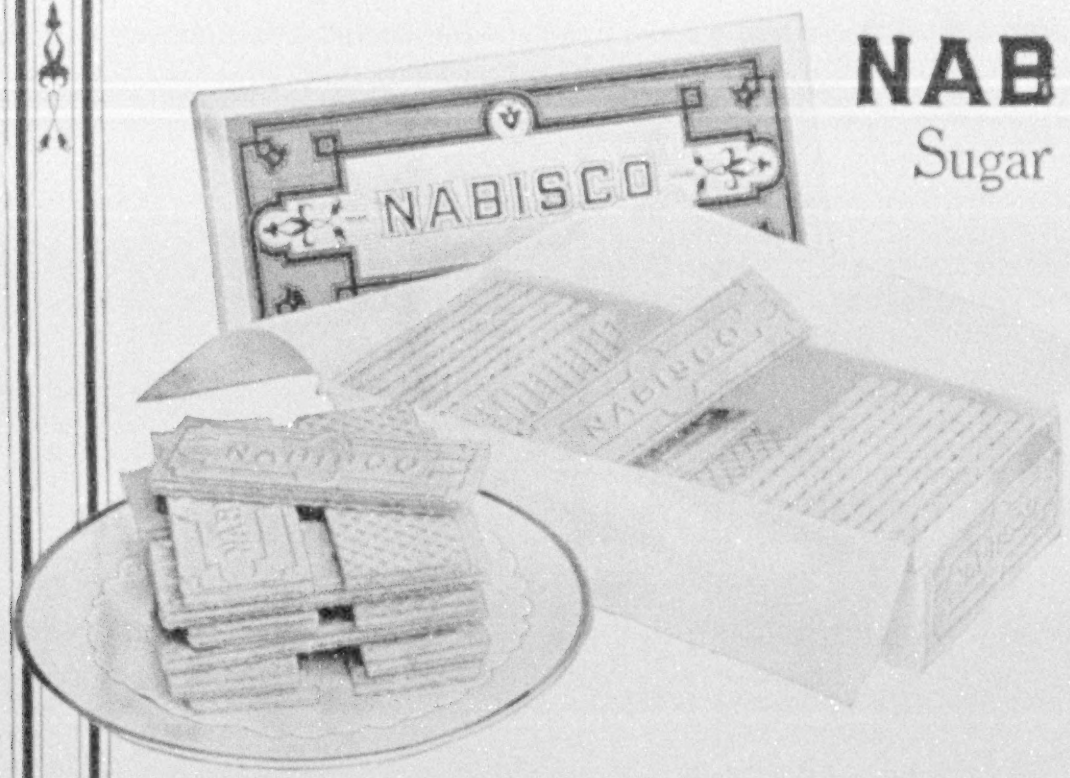

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Another dessert delight. Wafers of pleasing size and form with a bountiful confectionery filling. Another help to the hostess. In ten-cent tins.

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Tobacco has long been my hobby. Some call me a connoisseur. For 30 years I was constantly seeking an ideal Havana leaf.

I found it in a leaf which grows in a mountainous district in Cuba. It has the mildest, sweetest flavor I have ever known in tobacco. I have never found anything near so exquisite in a ready-made cigar.

An expert in Cuba secures this leaf for me, and I have it made up for my own private use, wrapped with my monogram band.

I have long supplied this cigar to my friends, and the circle of users has grown into thousands. Now I shall gladly supply a few more who seek a rare cigar.

I have no salesmen's salaries or expenses to pay; so you will find my prices surprisingly low. I ship to you direct at pretty close to my original cost.

But I can supply but a limited number; so I seek only men who want something exceptional—men who enjoy a rare, sweet smoke. I am not after bargain-hunters.

Five Cigars Free

If you will send me 10 cents—towards shipping expenses—I will mail you trial cigars. Smoke five with me. The price is $5 per hundred, $2.60 for 50—all charges prepaid. Use your letterhead, please, or your business card and **write now for the five cigars.**

J. ROGERS WARNER
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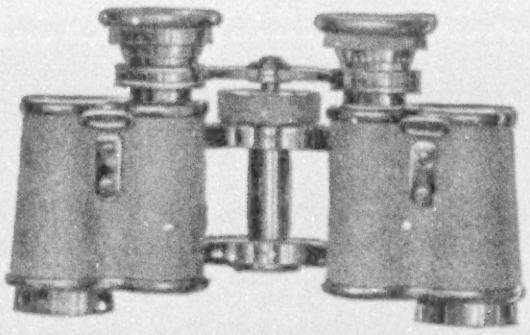
Bausch and Lomb-Zeiss Stereo Prism Binoculars



These superior binoculars, with their prism construction, give a field of view about *nine times as great* as that of the ordinary field glass, with wonderfully *even illumination* and *clear definition*.

Their *stereoscopic effect* enables one to judge more accurately distances and the relative position of objects in a landscape.

At the same time they are unusually light and compact—easy to carry and convenient to use.

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For over three years French and German motorists have been getting from 10,000 to 15,000 miles out of their tires by "half-soling" them with Steel Studded Treads.

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We ship on approval without a cent deposit, **prepay the express** and allow you to be the judge.

Durable Treads double the life of your tires and are sold under a **signed guarantee for 5000 miles without puncture.** Applied in your own garage in thirty minutes.

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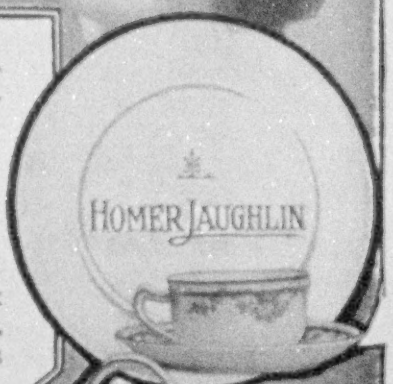

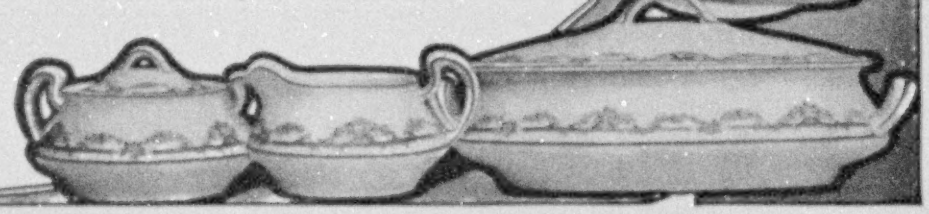

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You know that we use six-ply veneer for the walls of Indestructo trunks. By this we mean six layers of wood, glued together under enormous pressure and with the grain of each layer running crosswise the grain of the layers next to it.

The walls, so made, are light, but tremendously strong.

One layer of the six-ply Indestructo trunk wall is as strong as a plain piece of the same wood 2½ inches thick.

Now you can understand how we can freely offer to repair or replace, for five years, any Indestructo trunk damaged in traveling by any cause whatsoever.

What we want you to fully understand is that in appearance, in durability, in convenience, Indestructo baggage is the finest made. It is not expensive, either, but reasonably priced in many styles and arrangements—all of which are genuinely good. Write us for the name of the Indestructo dealer in your city.

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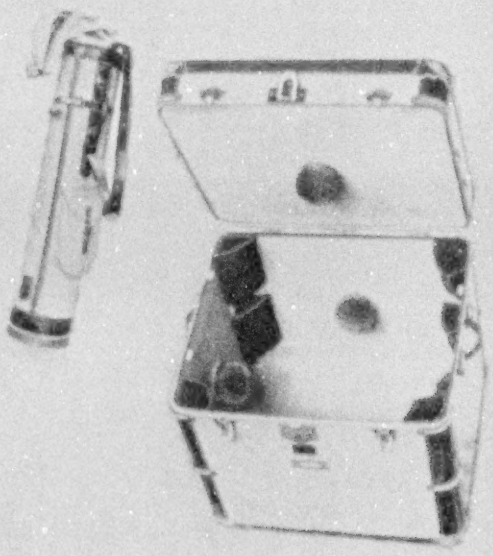

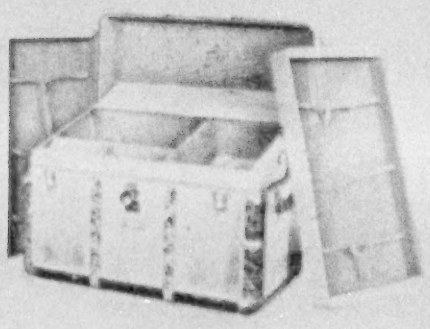

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Send for 128 Page Catalogue
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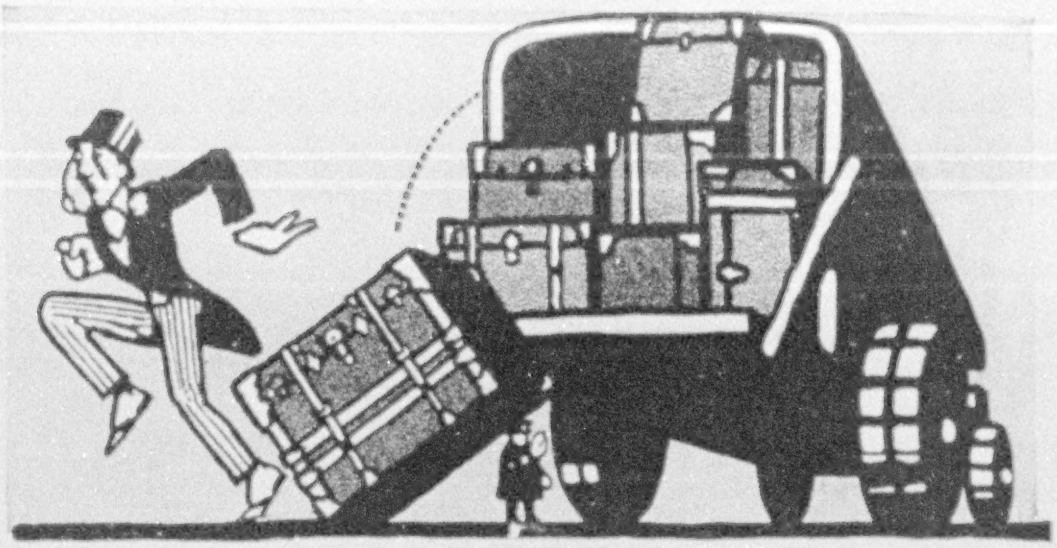

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where boys learn by doing. Actual contact, under competent instructors, with growing of crops and care of live stock on a 670-acre farm. Shops, work with tools and animals, deep woods, beautiful lake, boating, bathing, skating, healthful sports, right associates.

High standards of scholarship—under experienced instructors who know life and modern educational methods. Preparation for American and European universities. An exceptional school plant—gives opportunity for imitative and executive work. Only the sons of American business and professional men of good moral character admitted; the number is limited. Send today for catalogue. EDWARD M. RUMELY, Principal, Rolling Prairie, Indiana.

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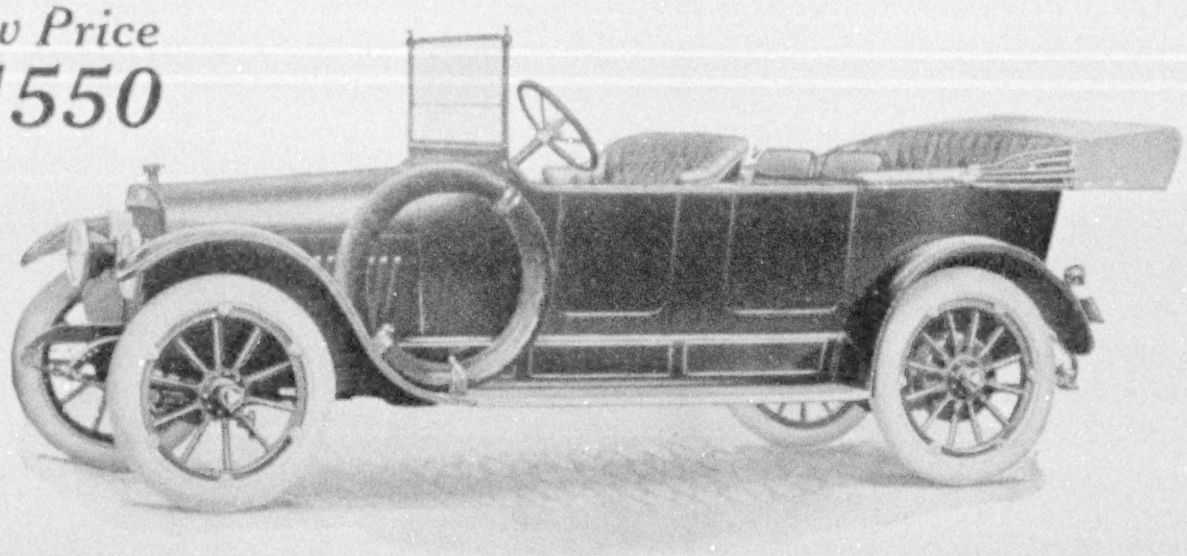
New Price
$1550



The New Criterion

In the HUDSON Six-40 for 1915 we present a new standard for quality cars. Go see how other cars measure up to it.

Here are new attainments in lightness, in beauty, in utter refinement. Here are new comforts, new conveniences. This new model brings out 31 improvements in a car which last year seemed perfection.

Here are new attractions in equipment. Here is new economy in operative cost—much below any Four of like power.

And here, above all, is a new quality price. Howard E. Coffin's finest production—the finished model of his ideal Six—is sold for $1,550. That price will force revision in former ideas of what high-grade cars should cost.

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Last year's price—$1,750—was the lowest price quoted on a quality car. The HUDSON Six-40 was so attractive at that price that the year's output was 3,000 cars oversold.

The demand compels a trebled output this year. That trebled output reduces the cost by $200 per car. So this new model, with 31 new features, sells $200 less than last year's model.

This is the gem car of the year. It will typify your ideal of a car. You will find in it many new points which appeal to you. Go see it now at your local HUDSON showroom.

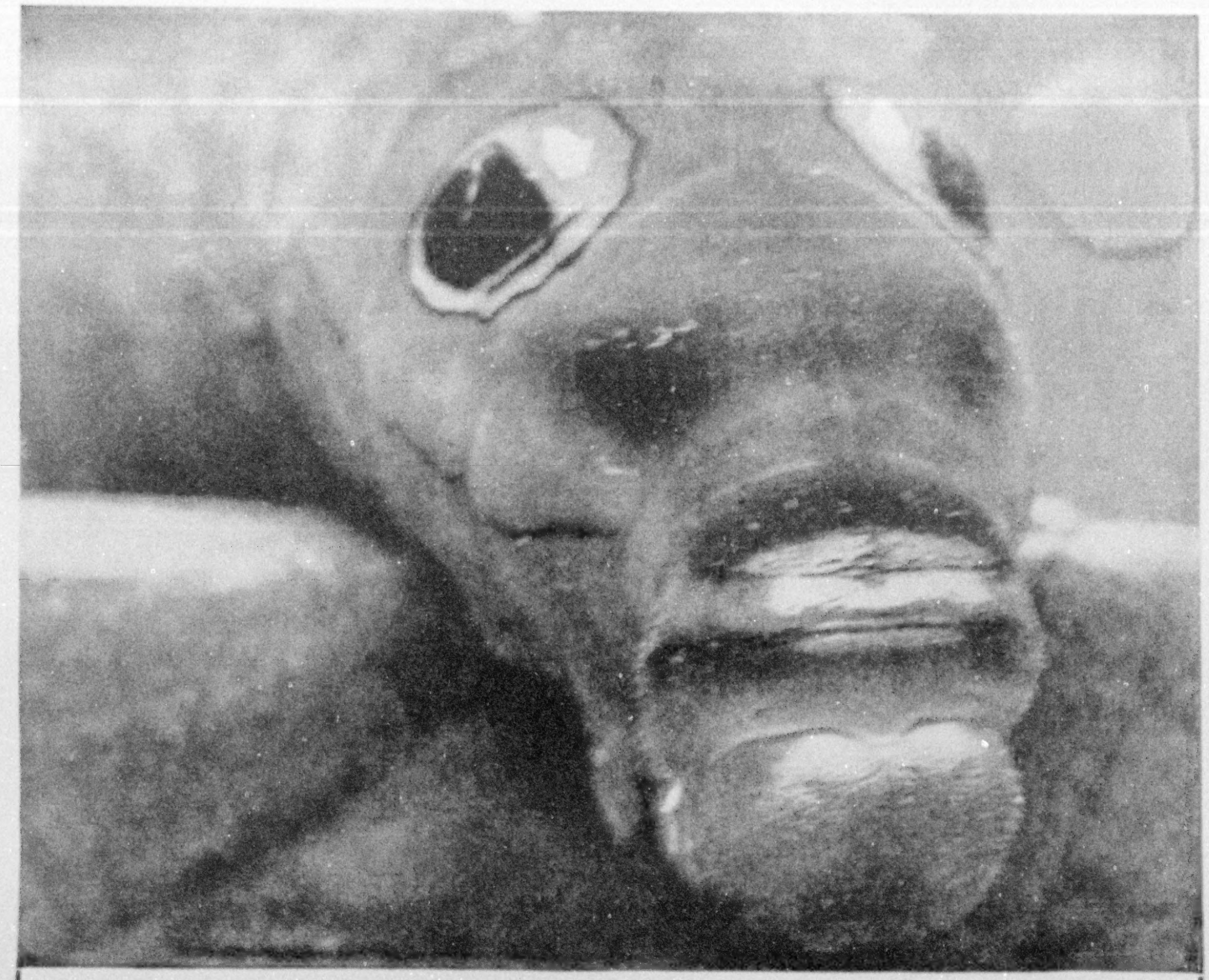
Phaeton, seating up to 7 passengers, $1,550 f. o. b. Detroit.
Standard Roadster, same price.

The HUDSON Six-54—built on the same lines, with a larger motor and a 135-in. wheelbase—sells for $2,350.

New catalog on request.

HUDSON MOTOR CAR CO., 8079 Jefferson Ave., Detroit, Mich.

(159)



© WHAT THE LARVA OF A BEAUTIFUL SWALLOW-TAIL BUTTERFLY LOOKS LIKE.

IS THIS, I wonder, an insect make-believe, a caterpillar mask, as it were, to frighten away enemies? The black and white eye-spots are not real eyes, but to a bird they doubtless seem so. Its real eyes are inconspicuous points at each side of the head, too small to appear in the photograph.

This monster is a leaf-eating creature, its purpose being the accumulation of food material out of which is made inside of it the gorgeous swallow-tail butterfly. It feeds on sassafras and spice-bush leaves, and when the time arrives makes a nest for itself by fastening the edges of a leaf together. In this nest it passes the winter. When spring comes it breaks open the gray shell of the chrysalis, unfolds a pair of black and gold wings with long tails to them, and flies away in the sunshine in search of flowers and a mate. It is then no more like this monster than an eagle is like a hippopotamus; yet after it has flown about, sucking nectar through its long beak, it mates and lays a mass of eggs, out of which hatch again these strange, weird beings.

Photograph by David Fairchild. From the "Book of Monsters," by David and Marian Fairchild, published by the National Geographic Society.

THE BOOK OF MONSTERS

By DAVID AND MARIAN FAIRCHILD

SELDOM can there be found such a unique combination of scientific fact and human interest as the authors have put into the "Book of Monsters." As though by a magic hand, spiders have taken on the size of tigers, tiny worms have grown as large as huge snakes, grasshoppers become as big as cattle, and a bee's sting is magnified into a many-barbed arrow.

There are more than one hundred and ten full-page illustrations in the book, which constitute the most surprising collection of photographs of the kind in existence. Each one brings some tiny creature, be it insect or worm, beetle or spider, moth or caterpillar, up to the relative size of the animals of the farm and the forest, and with it a full mete of wonder to the beholder, who through all his years has had eyes that have seen not, in so far as the insect world is concerned.

The "biography" of each monster is more fascinating than fiction, as accurate as mathematics, and written in a vein that captivates the boy or the girl and charms their elders. Here, for instance, is a view of the spider as the fly sees him: "Its claws of polished chitin, sharp as sword points, each with an aperture leading to a sac filled with poison; its array of eyes of different sizes; its mottled, hairy skin covered with hollow sensitive bristles, and its powerful leg-like palpi that must strike terror to the heart of its prey."

This book makes it possible to enjoy a new kind of big-game hunting in our own back yards, that might be termed "Shooting with the Shutter," and it gives new zest to nature study. It is a revelation of a world all but beneath our notice, and yet figuring immeasurably in the weal and woe of humanity.

Edition Limited ***Ready for Delivery August 1, 1914***

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16th and M Streets, Washington, D. C.

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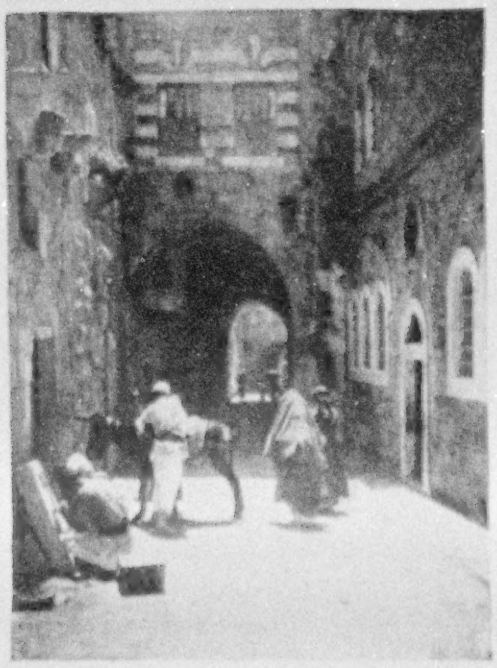

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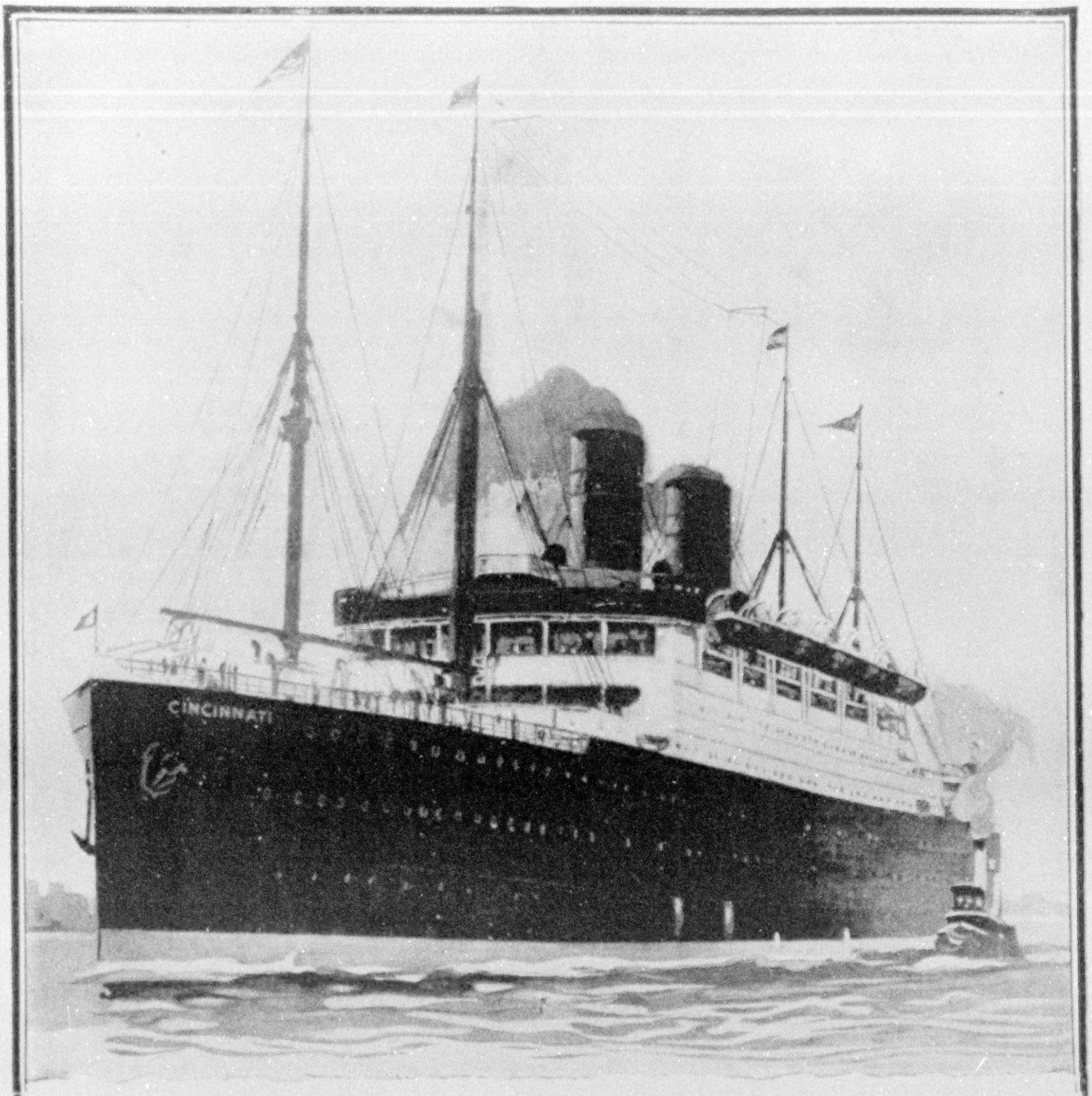

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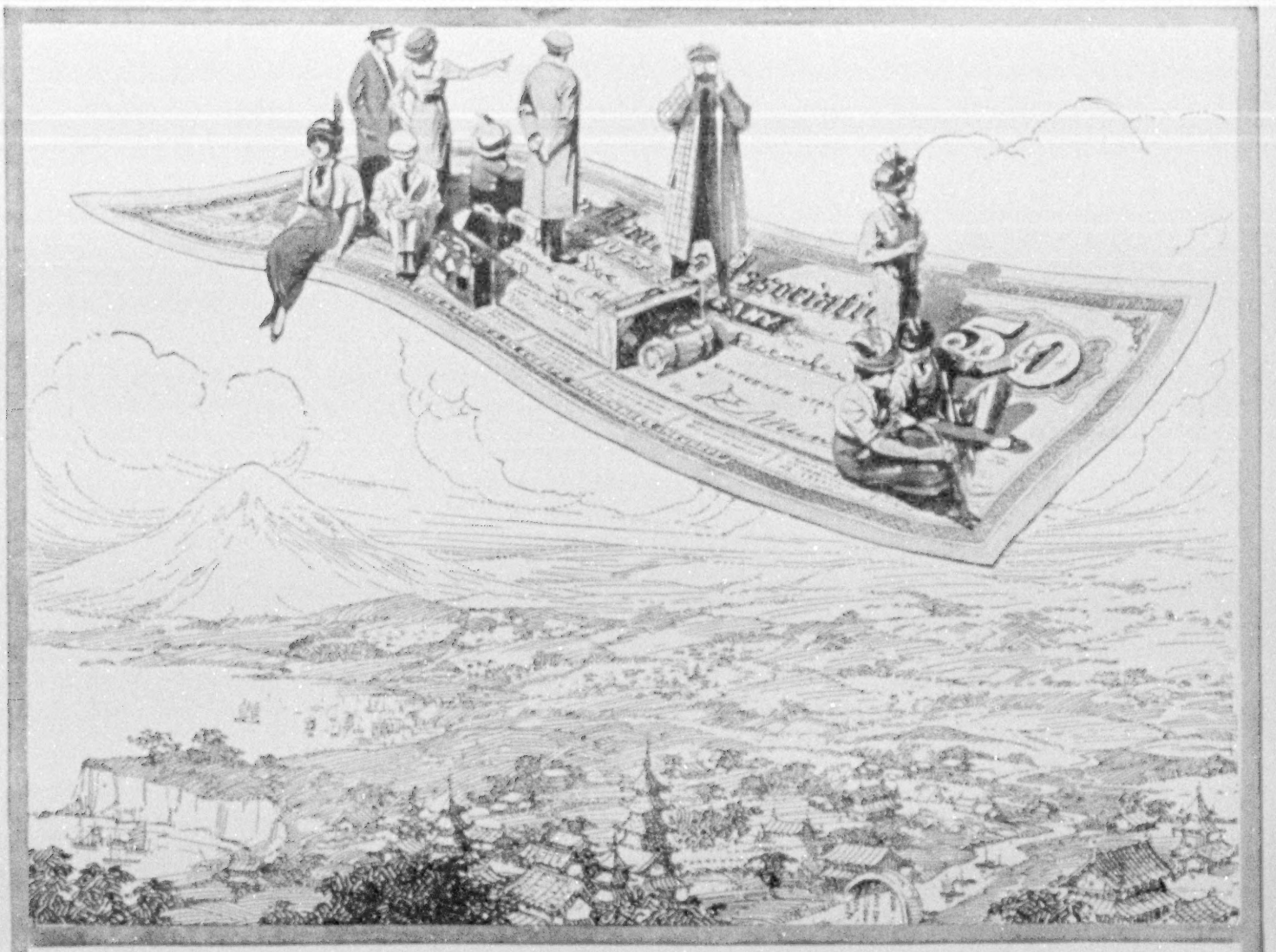

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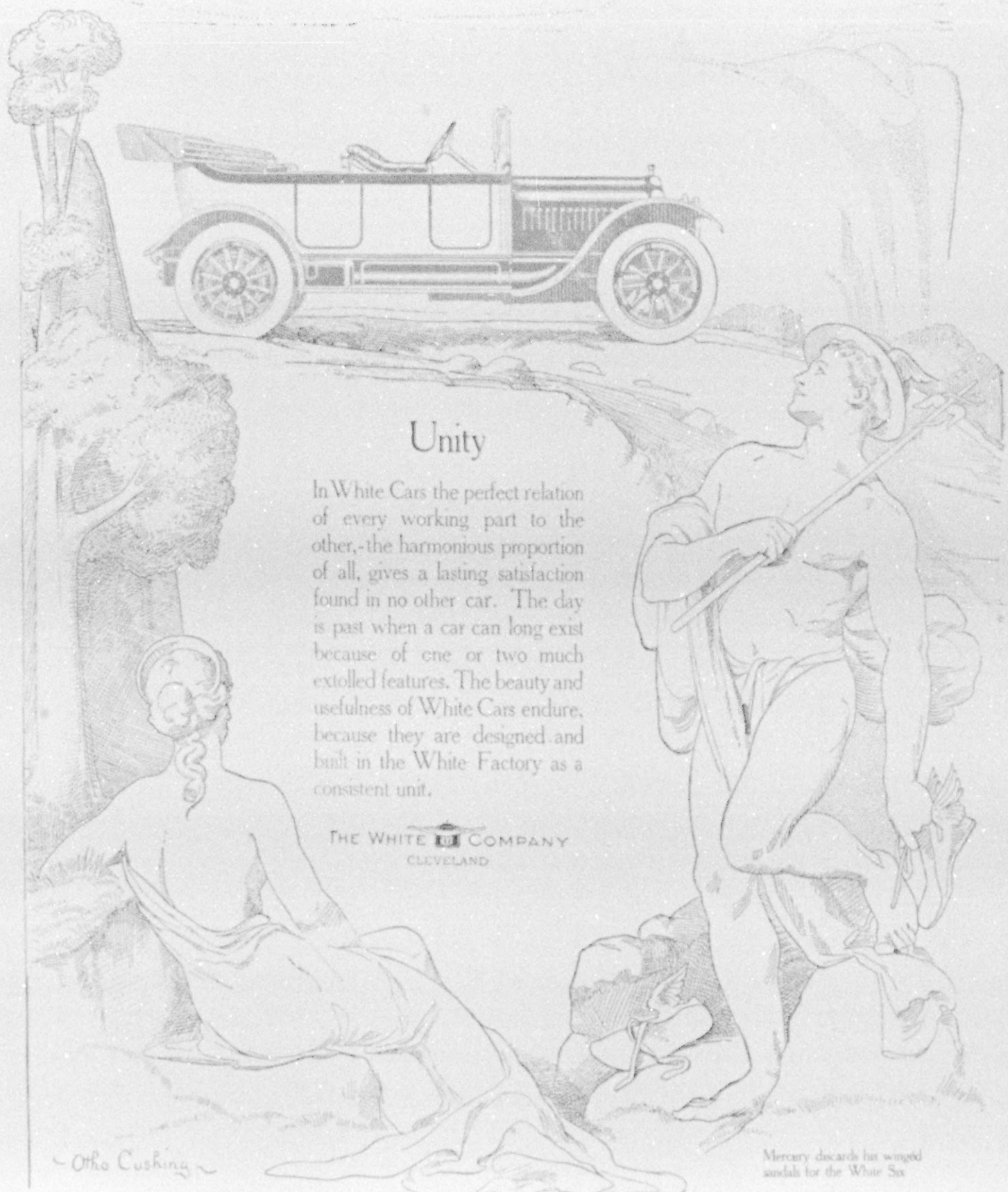

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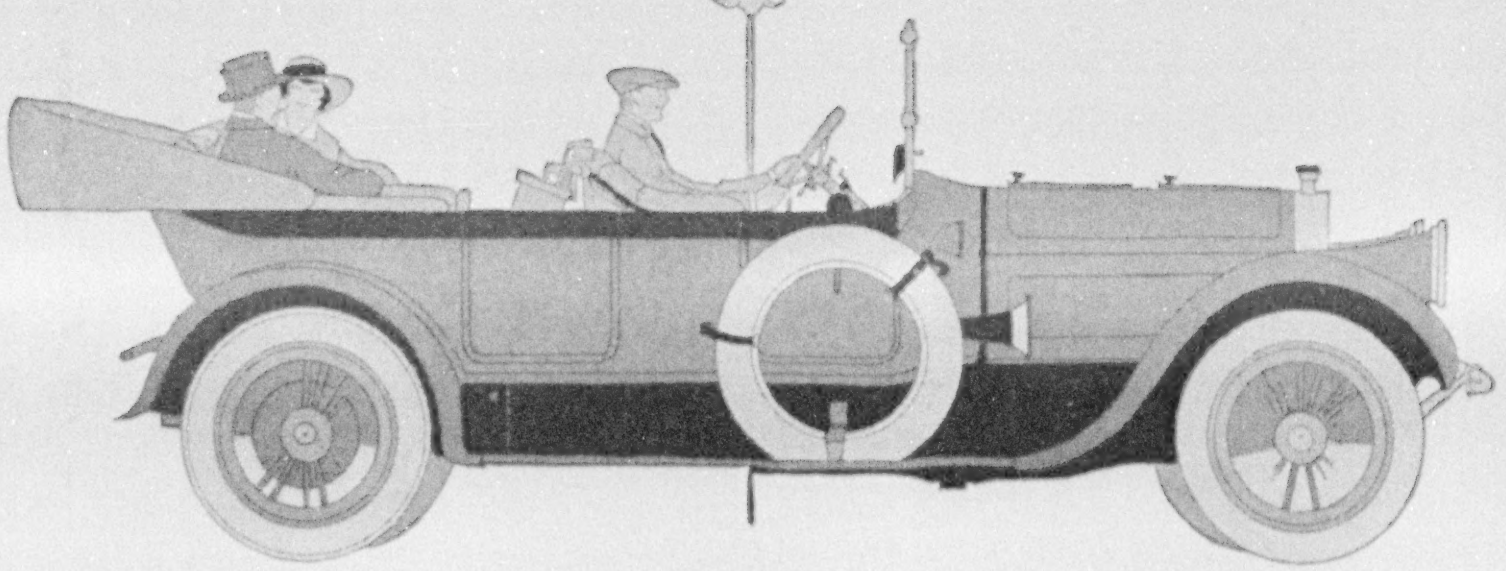
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